

REPORT OF DR. FOLKERS ROJAS, P.E.

DATED this 18th day of February 2025.

By: Folkers Rojas
Folkers Rojas, Ph.D., P.E.

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I. QUALIFICATIONS

1. My current Curriculum Vitae is attached as **Exhibit A**.
2. My degrees in engineering are from the Massachusetts Institute of Technology (“MIT”). I have received four degrees from MIT. I received two Bachelor's degrees in 2009, one in Mechanical and the second in Nuclear Science and Engineering, a Master's degree in Mechanical Engineering in 2011, and my Doctorate (Ph.D.) in Mechanical Engineering in 2014. I have been a licensed professional engineer since December 2017. I currently hold active Professional Engineering (“PE”) licenses in Texas, New Hampshire, Arizona, and Indiana. Additionally, I serve as the CEO of Millie Rojas Engineering P.C. (founded in December 2020), which is a registered and licensed engineering firm in the state of Arizona.
3. During my time at MIT, I took specialized courses in electrical systems, including DC low-voltage wiring, and I received specialized training in safety processes both in the classroom and as an employee, including 12V systems. While in the MIT Ph.D. program, I served as the environmental, health, and safety (EHS) officer for the Precision Engineering Research Group, and I was also a graduate machine shop instructor for the MIT Edgerton Student Shop.
4. I have summarized my educational and professional background in Table 1.

Table 1. Dr. Folkers Rojas Degrees from the Massachusetts Institute of Technology

#	Document	Institution	Year
1	Bachelors in Mechanical Engineering	Massachusetts Institute of Technology	2009
2	Bachelors in Nuclear Science and Engineering	Massachusetts Institute of Technology	2009
3	Masters in Mechanical Engineering	Massachusetts Institute of Technology	2011
4	Ph.D. in Mechanical Engineering	Massachusetts Institute of Technology	2014

5. My professional background includes performing root cause analyses¹ and evaluating electrical failures in consumer products (e.g., overheating DC batteries, and portable battery fires). My background also includes designing hardware components and performing product safety evaluations from an engineering perspective, as well as assessing compliance with industry regulatory safety standards (e.g., IEC 61010 [safety requirements for electrical equipment for measurement, control, and laboratory use] and ASTM F963: Standard Consumer Safety Specification for Toy Safety).

6. My background also encompasses industry experience, including working with and adhering to the Bureau of Safety and Environmental Enforcement for the Oil & Gas sector.

7. As part of my mechanical engineering engagements, I have helped companies design hardware, create engineering drawings, perform risk assessments, establish protocols for receiving components, create assembly drawings, establish traceability infrastructure, set up product data management databases for tracking revision-controlled documents, and contribute to intellectual property (“IP”) generation.

II. FEES & EXPERT TESTIMONY

8. I have been retained by Bidegaray Law Firm, LLC, as an expert witness in this litigation to provide opinions, testing data, and analysis related to Forest River Inc. towable Recreational Vehicles (“towable RV(s)”) products, specifically the seven-way cord and

¹ Root cause analysis (RCA) is a formal methodology or process of discovering the root causes of problems in order to identify appropriate solutions. RCA assumes that it is much more effective to systematically prevent and solve for underlying issues rather than just treating ad hoc symptoms and putting out fires. Root cause analysis can be performed with a collection of principles, techniques, and methodologies that can all be leveraged to identify the root causes of an event or trend. Looking beyond superficial cause and effect, RCA can show where processes or systems failed or caused an issue in the first place.

associated wiring into the battery compartment (“seven-way wiring”). The fee for my services, in this case, is my standard hourly rate of \$500 per hour, plus expenses. I have no vested interest, financial or otherwise, in the outcome of the current litigation. As a licensed Professional Engineer (“PE”), I am “entrusted to protect the public health, safety, and welfare” (i.e., Per 137.55(a) Texas Engineering and Land Surveying Practice Acts and Rules Concerning Practice and Licensure). The mandate to hold public safety first and foremost is in the Rules and Bylaws of several State Professional Engineering Licensing Boards.

III. MATERIALS CONSIDERED FOR THIS REPORT

9. In reaching the conclusions outlined in this report, I have relied upon my education, background, experience, research, and experiments, as well as documents and information provided to me to date. My conclusions are to a reasonable degree of engineering certainty. I reserve the right to modify or supplement my opinions, as needed if additional material or information is later provided.

10. I have reviewed the discovery produced in this case, pleadings, all depositions, hearing transcripts, all materials set forth in my February 11, 2025 Affidavit, independent research regarding RV fires, analysis of the seven-way wiring defects, inspected the 2019 and 2020 Puma trailers, conducted experiments regarding issues in this case, worked with Dr. Matthew Angle regarding issues in this case and conducted an extensive investigation of Forest River seven-way wiring on towable RVs, reviewed recalls from Forest River as well as other manufacturers including the June 2024 partial recall, performed comprehensive root cause analysis, collaborated with Dr. Angle to assess the seven-way wiring defects in Forest River’s towable RVs, Forest River Recall for the Cedar Creek and Puma from 2024

11. In addition, I reviewed the following but broke them out so they are identified by terminology that I will use in this report.

Table 2.

#	Name
Applicable Standards	ANSI/RVIA LV 2020 (ForestRiver0000033-53)
	NFPA 1192 (2018) (ForestRiver0000777-836)
Guide 1192	Guide to NFPA 1192 (Version 2014) (ForestRiver0000973-1557)
Wiring Guide	Forest River Electrical Guidelines (Rev 2) (ForestRiver0004990-5058)
Partial Recall	Part 573 Safety Recall Report 24V-395
	Recall 24V-395/2024-316 REMEDY INSTRUCTIONS
	Recall 24V-395 Quarterly Report (ForestRiver0030437)
OCC Procedures	Forest River Written Procedure for Safety Act Compliance (ForestRiver0001764-1793)
Document Policy	Forest River Document Retention Policy (ForestRiver0000136-148) ²

12. I have also relied upon a Field Investigation that Dr. Matthew Angle and I performed to quantify the extent of the prevalence of the unprotected seven-way wiring in Forest River towable RVs. I also relied on inspection of the original 2019 Puma, 2020 Puma ('Puma Inspections'). Additionally, wiring experiments performed in Nov 2024 conducted by Dr. Matthew Angle, and I.

13. Specifically, I have also reviewed and considered the material discussed in the **Appendix** section of this report.

IV. FACTUAL BACKGROUND

14. On April 26, 2019, Jay Nelson purchased a Forest River 2019 Puma ("2019 Puma") from D&D RV Center ("D&D RV") (VIN: 4X4FPUF28KP079346; ForestRiver0000065-66).

15. On May 29, 2020, the 2019 Puma belonging to Jay Nelson caught fire.

² The document was created on August 22, 2022.

16. On June 2, 2022, at 9:43 AM, Chad Wenger (D&D Warranty manager) sent an email to Gretchen Gonzalez, the Forst River Puma warranty manager, notifying her that *“It looks to me as a connector in the junction box was not crimped properly for the charge line and that caused the short and fire. Customer is very upset about this as it could have burned their camper to the ground.”* (ForestRiver0000086).

17. Jay Nelson decided to trade the fire-damaged 2019 Puma for a 2020 Puma (VIN #: 4X4FPUF22LP084415). (ForestRiver0000002).

18. After purchasing the 2020 Puma, he discovered that it had seven-way wiring defects that violated applicable standards.

19. Upon reviewing photos of the 2019 Puma, it had the same seven-way wiring defects that violated applicable standards, and it would not have caught fire had it been wired in compliance with those standards.

20. On June 9th, 2022, Forest River Inc. was served with the Nelson Lawsuit (“Nelson Lawsuit”) outlining the seven-way wiring defects that violated applicable standards.

21. After being served in June 2022, Forest River launched a survey (“2022 Survey”) (ForestRiver0030448-30520) directed to nearby plants as a direct response to the Nelson Lawsuit. The 2022 Survey was completed in June/July 2022 and asked inspectors to document the “Charge Line & Breakaway Switch Wiring” by sketching a “drawing showing all connection points from the charge line in the J Box (junction box) to the positive terminal on the battery.” (ForestRiver0030465). The results of the 2022 Survey showed that over 60% (39 out of 64) of the plant responses had seven-way wiring that was not compliant with ANSI/RVIA LV and NFPA 1192 (“Applicable Standards”). The 2022 Survey was informally produced to Plaintiff on January 15, 2025, and officially produced on February 4, 2025. This was over 2.5 years after it

was conducted. The results of the 2022 Survey were not provided to NHTSA, dealers, consumers, or apparently even Forest River's lawyers until January 2025.

22. On April 3rd, 2024, Forest River corporate (including Leo Akins, William Conway, Ed Chupp, and possibly more) with counsel inspected the Nelson 2019 Puma.

23. Following the April 3rd, 2024, inspection, Forest River conducted a 2024 Survey ("2024 Survey") of 5th-wheel RVs.

24. On June 4, 2024, Forest River issued a 100% partial recall of all Cedar Creek and Puma 5th Wheels, covering 20 years of Cedar Creek production and 18 years of Puma production.

25. In September 2024, a field investigation ("Field Investigation") was launched by Jay Nelson's counsel to determine the prevalence of Forest River's faulty low-voltage wiring. The Field Investigation ended in December 2024, and data analysis was performed in January/February 2025. The results indicated that over 50 models were impacted.

26. In November 2024, the 2019 Puma underwent an inspection to review its wiring and examine Forest River's theories, and the 2020 Puma was also inspected. During the inspection of the 2019 Puma, we rewired it to comply with applicable standards.

27. On January 15, 2025, Forest River's counsel informally produced the 2022 Survey that conclusively showed over 60% of its manufacturing facilities producing towable RVs had seven-way wiring that did not comply with applicable standards.

28. On February 4, 2025, the 2022 Survey was officially produced, as was a wiring schematic (ForestRiver 0030521) that had not previously been produced, which shows that Forest River had not incorporated overcurrent protection on the seven-way wiring charge line for travel trailers or pop-ups.

V. SUMMARY OF OPINIONS AND EXPECTED TESTIMONY

29. Forest River, Inc. produces towable RV units with seven-way wiring that is not compliant with applicable standards. When I refer to wiring or wiring defects I am referring to the seven-way wiring. As shown in Figure 1, Forest River attached an RV Industry Association decal (“RVIA Seal”) stating that the “manufacturer certifies compliance with the Standard for Recreational Vehicles, NFPA 1192.” The National Fire Protection Association 1192 Standard (“NFPA 1192”) low voltage section refers to the RVIA LV Standard. Both the NFPA 1192 and RVIA LV Standard are the applicable standards for the towable RV (“Applicable Standards”). Recreational vehicle original equipment manufacturers (“RV OEMs”) are responsible for abiding by the Applicable Standards.



Figure 1. Dr. Matthew Angle, on November 13, 2024, inspection of the 2019 Puma with the RVIA Seal denoting that the vehicle complies with NFPA 1192

30. Furthermore, the data decal sticker containing the manufacturer information, VIN, etc., also states that the “vehicle conforms to all applicable U.S. federal motor vehicle safety standards in effect on the date of manufacture shown.”

31. However, based on numerous RV inspections performed with Dr. Matthew Angle, there is a significant number of Forest River RV units currently for sale and in the public

domain that are not compliant with the Applicable Standards with regard to the seven-way wiring.

32. In June 2020, Forest River was notified of Jay Nelson’s fire incident.

33. Because of this lawsuit, Forest River issued a partial Recall (NHTSA Recall No 24V-395) to address improper seven-way wiring (violating accepted RV industry standards) for all Cedar Creek Fifth Wheels (2004–2024) and all Puma Travel Fifth Wheels (2006–2024) is only the tip of the iceberg. This partial recall did not address all seven-way wiring defects nor did it address all affected Forest River units.

34. For approximately 20 years, Forest River failed to catch the improper electrical wiring in these two Forest River RV models. An ongoing investigation (“Field Investigation”), summarized in Table 3, has revealed that the improper electrical wiring extends substantially beyond the Puma Travel 5th Wheels and Cedar Creek Fifth Wheels, and Forest River is fully aware of this issue. The results of the Field Investigation are consistent with a survey performed by Forest River in June/July 2022 (“2022 Survey”) that was revealed informally on January 15, 2025 and formally on February 4, 2025, showing that at least 39 out of 64 surveyed units had unprotected wiring. There were 20 fifth wheel plants surveyed, and 11 out of the 20 plants had unprotected seven-way wiring. The 2022 Survey will be discussed in depth shortly.

Table 3. Investigation of Forest River RV models

Detail	Value	Note
Approximate # of Forest River Models	130	Some models were consolidated (i.e. Coachmen-Catalina Expedition, Legacy, etc.)
Number of Models Found	96	Up to December 2024
Number of Models w/ Closed Bottom	11	
Inspected Models	85	
# of Models found in Investigation with wrong wiring	50	Includes Cedar Creek and Puma 5 th Wheels that are still not fixed

# of Models found in Investigation that have yet to be recalled	48	Two Models already recalled are: Cedar Creek and Puma 5 th Wheels
Minimum % of Inspected Models with Defects	59%	There are additional models that are suspected to have the wrong wiring.
Estimate of Total Models w/ Defects NOT Yet Recalled	76	= # of Models * % Defects – 2 (Cedar Creek & Puma)

35. Out of the cataloged ~130 Forest River models, 96 models were found in dealer lots, and 11 of those models have a bottom closed with plastic cover (unable to inspect). As a result, we were unable to inspect these units to see if they contained wiring errors, but now we know, because of recently discovered documents, that some of the closed units do have the wiring error. Thus, we were able to inspect 85 models, and of those inspected, we found approximately 50 plus models having the electrical breaker error. Extrapolating the pattern from the inspected models, at least approximately 60% of Forest River towable RV models have the improper electrical wiring; thus, out of the ~130 Forest River towable RV models, there are an estimated 76 models that have yet to be recalled. Due to poor traceability in Forest River quality control processes, all units will likely need to be inspected, and over 60% of the units need one or more wiring issues fixed.

36. Currently, there are at least 10 plants producing 16 different Forest River towable RV models after June 4, 2024, recall date that are still being wired incorrectly.

37. The Field Investigation also revealed that electrical wiring is not the only violation of RV Standards.

38. There is also evidence from Forest River's own Warranty Claims that Forest River was aware multiple plants were producing seven-way wiring in violation of applicable standards. The following are three examples. A warranty claim from 2016 on a Sierra states: "there is no circuit protection, the chrage (sic) line goes right to the battery side lug"

(ForestRiverR0029181). A second warranty claim of a Cherokee states that the unit is “*wired incorrectly, it is missing a circuit protection device between the 7-way plug and the battery*” (ForestRiver0029501-29502). The third, produced on February 4, 2024 (ForestRiver0030439) from a 2013 Montana warranty claim, states, “*Found 7-way cord wires loose & shorted to junction box. Charge line shorted on the metal j-box. The charge line is connected to the same side of the circuit breaker as the battery cable=no circuit protection.*” (ForestRiver0030439). There are multiple similar examples of this nature.

39. Forest River has repeatedly been put on notice via the warranty claims that the seven-way wiring violates applicable standards. Despite being on notice of the problem well before the 2022 Survey, no root cause analysis was performed, nor was any change made.

40. As part of understanding the Forest River sequence of events that led to systemic wiring errors, I reviewed the nine Forest River depositions.

41. Matt Gingerich (Forest River Director of Corporate Standards) stated during his January 16, 2025 deposition that “on a travel trailer there is no overcurrent protection on the charge line” (M. Gingerich Dep. 20:23-24). No overcurrent protection on the charge line is a violation of ANSI/RVIA LV Section 3-1. Furthermore, according to Forest River’s own statements in NHTSA Recall No 24V-395, this error can result in a fire. However, the 24V-395 recall does not adequately address the defects that exist or the models affected by the wiring errors.

42. During the depositions, it was also revealed that Forest River had an investigation after being served with the Nelson Lawsuit on June 9, 2022 (ForestRiver0016946). Emails from counsel show that the 2022 investigation was performed as a direct response to the Nelson Lawsuit.

43. Per the request of Forest River Office of Corporate Compliance (Director: Leo Akins) to the “plant inspectors” of the Office of Codes and Standards (Director: Matt Gingerich) were to perform the 2022 Survey as a response to the claims in the Nelson Lawsuit. The 2022 Survey indicates that at least 39 out of 64 plants had unprotected seven-way wiring. Forest River failed to provide the documents in discovery for 2.5 years in the Nelson Lawsuit. The 2022 Survey contains details on 20 fifth-wheel plants, 1 tent camper trailer plant, 1 destination trailer plant, and 42 travel trailer plants (ForestRiver0030448-30520). The withheld 2022 Survey only came to light on January 15, 2025, after the deposition of Rodney Smith. Figure 5 shows the review of the 2022 Survey, where every vertical orange column denotes an error with the seven-way wiring, and the brown caps are models that the Field Investigation identified as having wiring defects. In short, Forest River was fully aware of the problem in the summer of 2022. Furthermore, Forest River did not disclose the electrical wiring errors to RVIA, NHTSA, dealers, or any customers.

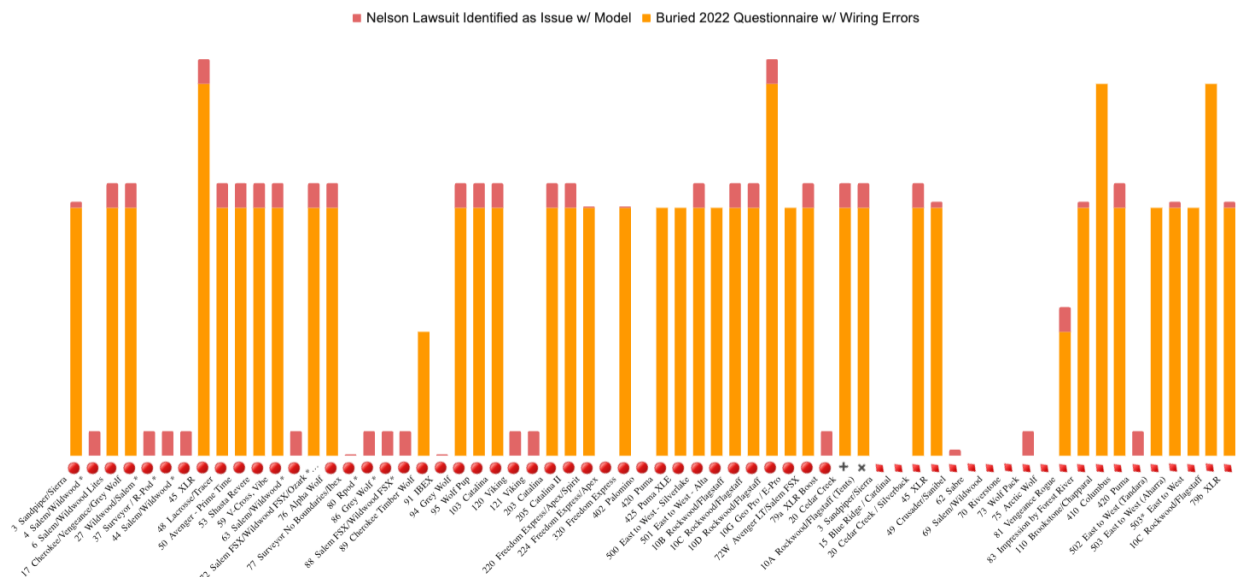


Figure 2. 2022 Investigation shows that 40 out of 64 plants had one or more errors that resulting in seven-way wiring defect. Key: ● Travel trailers, + Tent Campers, ✕ Destination Trailers, and ■ Nelson Lawsuit Field Investigation identified.

44. Forest Rivers' failure to document the low voltage configuration during the assembly process and its disarray of training across the board has created a situation where all Forest River towable RV units in the last 20 years need to be inspected. Per dealer quotes, the minimum inspection time ranges between 30 minutes to 1 hour, depending on their internal rates and particular RV model. Using a conservative annual production estimate of 100,000 RV units per year, over the last 20 years, Forest River has produced more than 2.0 million towable RV's that are impacted and need inspection.

45. Based on first-order production estimates, the number of units to repair is likely more than 1.2 million units (the range of repair is between 51 models and 76 models). Figure 6 shows a highly conservative estimate that outlines damages-based information from the 2022 Survey and the 2024 Field Investigation. The cost of parts is ~\$30 per unit. The total cost to repair per unit is less than \$600.

46. Using the defect percentages of the 2022 Survey, the estimate for damages is likely ~\$2.26 billion, and using the defect percentages of the Field Investigation, the total damages is likely ~\$2.51 billion.

47. In conclusion, as a Licensed Professional Engineer in multiple states including a recently attained Indiana Professional Engineering license, it is my professional opinion, based on my education, engineering background, applicable standards, depositions of Forest River personnel, experiments, materials provided, deposition material, and field investigation, that several brands (beyond Cedar Creek and Puma) of Forest River products have seven-way wiring defects that violate applicable standards and if not remedied can result in a fire hazard.

VI. THE REASON OVERCURRENT PROTECTION EXISTS

48. Overcurrent protection is not a new thing, textbooks such as Experiencing Electricity & Electronics by Mark E. Hazen published 1989 outlines the two things of interest: 1) need for overcurrent protection device, and 2) placement of the overcurrent protection device as shown in Figure 3 and Figure 4 respectively.

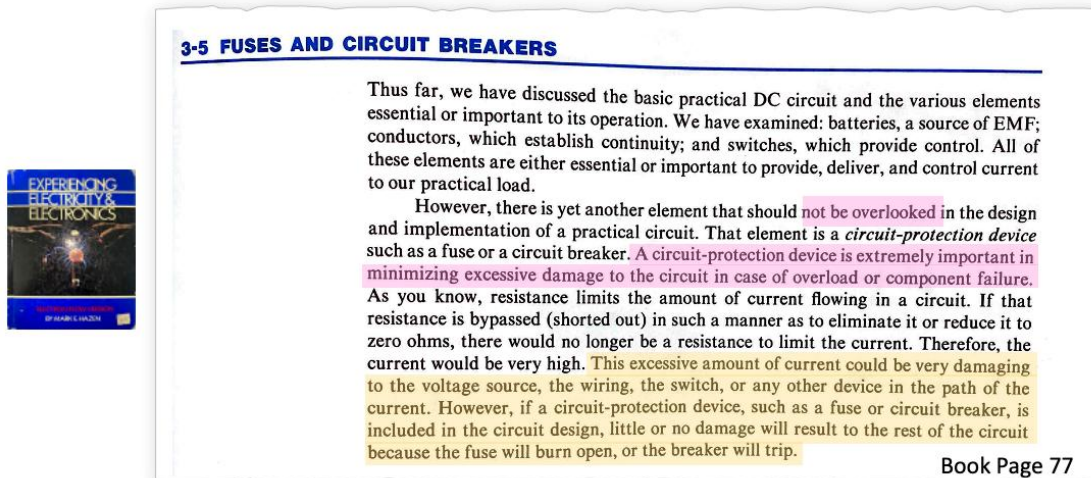


Figure 3. Book Reference showing the need for circuit-protection device

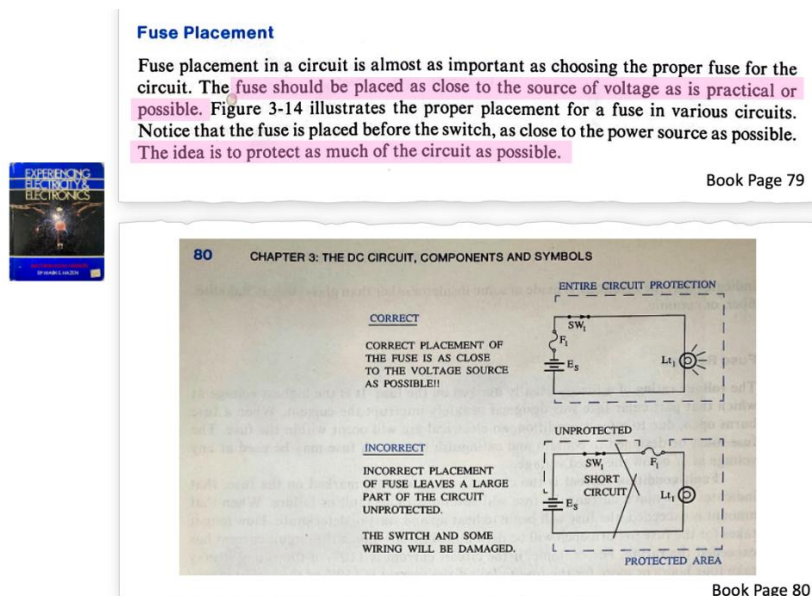


Figure 4. Textbook References show that the placement of fuse/circuit breaker shall be placed as close as possible to the source.

A. Consumer Representation

49. Forest River places on each towable RV the RVIA Seal that states the “manufacturer certifies compliance with the Standards for Recreational Vehicles NFPA 1192.” This Seal and a second sticker both tell consumers the towable RVs are manufactured according to applicable standards.

50. Not only do these certifications lull a consumer into believing Forest River complied with the certification, but a normal consumer is not going to detect these seven-way wiring defects.

51. Even dealers rely on Forest River to provide towable RVs in compliance with the Applicable Standards.

B. Industry Recalls of Unprotected Battery Wiring

52. Unprotected wiring can result in a fire if there is a short. The result is simple: if the line from the battery is unprotected and there is a short, then “the wire may burn and cause a vehicle fire.”

53. Forest River statement to the Court on February 13, 2025, shows (Court Record 135, 23:14-17) that the standards for towable RVs do not require overcurrent protection for the “7-way cord and travel trailers” is wrong. The following examples show that other RV OEMs have recognized the implications of having unprotected wires in towable RVs.

January 30, 1980 NHTSA CAMPAIGN NUMBER: 80V006000
ELECTRICAL SYSTEM:FUSE AND RECEPTICLE:CIRCUIT BREA

NHTSA Campaign Number: 80V006000
 Manufacturer SHASTA INDUSTRIES
 Components ELECTRICAL SYSTEM
 Potential Number of Units Affected 440

Summary
 ON CERTAIN VEHICLES, THE CIRCUIT BREAKER PROTECTING THE LINE FROM THE RV BATTERY TO THE CONVERTER MAY HAVE BEEN OMITTED.

Remedy
 DEALER WILL INSPECT AND, IF NECESSARY, INSTALL CIRCUIT BREAKER WITHOUT CHARGE TO OWNER.

Notes
 VEHICLE DESCRIPTION: TRAVEL TRAILERS.SYSTEM: ELECTRICAL; CIRCUIT BREAKER.CONSEQUENCES OF DEFECT: IF A SHORT OCCURS IN THE ELECTRICAL LINE FROM THEBATTERY, THE WIRE MAY BURN AND CAUSE A VEHICLE FIRE. PERSONAL INJURY COULDRESULT.NOTE: REMOVE THE CABLES FROM THE NEGATIVE (-) TERMINAL OF THE BATTERY LOCATEDON THE "A" FRAME AND LEAVE THEM DISCONNECTED UNTIL AFTER THE REPAIR. DO NOTATTEMPT TO INSTALL THE CIRCUIT BREAKER; INSTALLATION SHOULD BE DONE BY ANAUTHORIZED DEALER.

2 Affected Products

MAKE	MODEL	YEAR
SHASTA	SHASTA	1979-1980

January 30, 1980 NHTSA CAMPAIGN NUMBER: 80V006000
ELECTRICAL SYSTEM:FUSE AND RECEPTICLE:CIRCUIT BREA

Summary
 ON CERTAIN VEHICLES, THE CIRCUIT BREAKER PROTECTING THE LINE FROM THE RV BATTERY TO THE CONVERTER MAY HAVE BEEN OMITTED.

VEHICLE DESCRIPTION: TRAVEL TRAILERS.SYSTEM: ELECTRICAL; CIRCUIT BREAKER.CONSEQUENCES OF DEFECT: IF A SHORT OCCURS IN THE ELECTRICAL LINE FROM THEBATTERY, THE WIRE MAY BURN AND CAUSE A VEHICLE FIRE. PERSONAL INJURY COULDRESULT.NOTE: REMOVE THE CABLES FROM THE NEGATIVE (-) TERMINAL OF THE BATTERY LOCATEDON THE "A" FRAME AND LEAVE THEM DISCONNECTED UNTIL AFTER THE REPAIR. DO NOTATTEMPT TO INSTALL THE CIRCUIT BREAKER; INSTALLATION SHOULD BE DONE BY ANAUTHORIZED DEALER.

RV MANUFACTURER Shasta RV:
Well known from 1980 that omitting a circuit braker on battery connection of a travel trailer can result in a fire (given a short).

Figure 5. Shasta Industries unprotected example from 1980

54. In 2016, RV manufacturer Jayco omitted a 30-amp circuit breaker, which resulted in having unprotected circuitry that, in the event of a short, can cause a fire, hence the recall of NHTSA 16V-230.

Part 573 Safety Recall Report 16V-230

Manufacturer Name : Jayco, Inc.
 Submission Date : APR 19, 2016
 NHTSA Recall No. : 16V-230
 Manufacturer Recall No. : 9901295

Manufacturer Information :
 Manufacturer Name : Jayco, Inc.
 Address : 501 South Main Street
 PO Box 480 Middlebury IN 46540
 Company phone : 800 283 8267

Population :
 Number of potentially involved : 307
 Estimated percentage with defect : 100

Vehicle Information :
 Vehicle : 2016 2016 Travel Trailer certain Octane Super Lite
 Vehicle Type : TRAILERS
 Body Style :
 Power Train : NR
 Description Information : C1702219 0036
 C1702219 0041
 C1702219 0087
 C1702219 0082
 Production Dates : NHTSA 02/01/15 - APR 04, 2016
 VIN (Vehicle Identification Number) Range :
 Begin : NR End : NR ☐ Not sequential VINs

Description of Defect :
 Description of the Defect : 30amp circuit breaker omitted after design change to add a side battery box to certain octane **super lite travel trailers**
 FMVSS 1 : NR
 FMVSS 2 : NR
 Description of the Safety Risk : the **unprotected circuit**, could result in short that could **cause fire**
 Description of the Cause : Error made during production
 Identification of Any Warning that can Occur : NR

RV MANUFACTURER JAYCO:
Travel Trailer missing 30-amp circuit breaker results in unprotected circuit that could result in short that could cause fire.

Figure 6. Jayco Recall 16V-230

55. On June 25, 2024, RV OEM Brinkley issued a Recall 24V-476 that included “Model Z fifth wheels and the Model Z-Air travel trailers” for “lack of overcurrent protection” as shown in Figure 7.

Part 573 Safety Recall Report		24V-476
Manufacturer Name: Brinkley RV Submission Date: JUN 25, 2024 NHTSA Recall No.: 24V-476 Manufacturer Recall No.: REC-2402		
Manufacturer Information: Manufacturer Name: Brinkley RV Address: 1613 Brinkley Way East GORDON IN 46028 Company phone: 317-431-6289		
Population: Number of potentially involved: 1,157 Estimated percentage with defect: 100%		
Vehicle Information: Vehicle 1: 2023-2024 Brinkley RV Model Z Vehicle Type: TRAILER Body Style: NA Power Train: NA Description Information: The vehicles in the recall population include Model Z fifth wheels and Model Z-Air travel trailers. Within the 12 V system of the included units, there may be a lack of overcurrent protection (wiring connected to the non-protected side of the mini-breakers). A portion of the recall population also includes incorrect size wiring for a certain application (12V refrigerator). Products not included in the recall have been excluded as they were built to different specifications. The affected population includes 2892 units sold to US dealers and 265 units sold to Canadian dealers.		
Description of Defect: Description of the Defect: Within the 12 V system of the included units, there may be a lack of overcurrent protection (wiring connected to the non-protected side of the mini-breakers). A portion of the recall population also includes incorrect size wiring for a certain application (12V refrigerator). Products not included in the recall have been excluded as they were built to different specifications. The affected population includes 2892 units sold to US dealers and 265 units sold to Canadian dealers.		
Description of the Cause: Description of the Cause: There is an increased risk of thermal event (fire) in an over-current scenario of the unprotected line and/or under maximum consumption loading through the undersized wire for the 12v refrigerator.		

Figure 7. Brinkley Recall 24V-476

56. On June 17, 2024, Airstream, Inc., another RV manufacturer, issued a recall showing that wiring without overcurrent protection increases the potential for fire. In the case of Airstream they did not have the “required 12V in-line fuse” as shown in Figure 8.

Part 573 Safety Recall Report		24V-432
Manufacturer Name: Airstream, Inc. Submission Date: JUN 17, 2024 NHTSA Recall No.: 24V-432 Manufacturer Recall No.: NR		
Manufacturer Information: Manufacturer Name: Airstream, Inc. Address: 419 West Pike Street PO Box 629 Jackson Center OH 43084-0629 Company phone: 614-696-8111		
Population: Number of potentially involved: 2 Estimated percentage with defect: 100%		
Vehicle Information: Vehicle 1: 2024-2024 Airstream Interstate Vehicle Type: BUSES, MEDIUM & HEAVY VEHICLES Body Style: VAN Power Train: DIESEL Description Information: The recall population was established by reviewing the installation process and determined the deficiency began occurring due to a revision in the 12V back-up power supply electrical harness.		
Description of Defect: Description of the Defect: Affected units do not have the required 12V in-line fuse in place on the circuit designed to provide back-up power to the water heater/furnace system.		
Description of the Cause: Description of the Cause: If a short circuit should occur, the power supply wire would continue to heat up, and increase the potential for fire which could result in personal injury. We are attributing the root cause to a revision in the water heater/furnace 12V back-up power supply electrical harness.		
Identification of Any Warning that can Occur: Identification of Any Warning that can Occur: The owner could potentially smell something burning.		

Figure 8. Airstream Recall 24V-432

57. Regardless, the applicable code requires overcurrent protection on the seven-way charge line for all towable RVs that have a battery

VII. PARTIAL RECALL & WIRING SCHEMATICS REVIEW

58. This section presents the research performed into the Forest River Cedar Creek and Puma recall, NHTSA Recall No 24V-395 (“Partial Recall”), and how that led to the discovery of several unprotected electrical schematics/diagrams (ForestRiver0030521, ForestRiver0005214, ForestRiver0020997) and defective wiring diagram in Forest River Electrical Wiring Guide page 32 (ForestRiver0005021) that outlines the seven-way wiring without differentiation between types of towable RVs. Forest River initially claimed to have NO defect with the seven-way wiring, and produced the 12-VOLT drawing for 5th Wheels (ForestRiver0000011) as evidence. Table 4 shows a list of what may be considered Forest River’s best effort to document their seven-way wiring. The material related to the Electrical Guide (ForestRiver0004990-5058) is covered in the next chapter with the 2022 Survey.

Table 4. List of electrical schematics and sketches

DWG #	Series	MOD #	Date	Designation	Initials	Notes
12-VOLT	Fifth Wheels	001	10/15/1998	98 Mod. Review	TJA	Pass Code
			6/29/2000	Drawing Date		
		002	3/6/2001	Delete 8GA Wire	TJA	
		003	1/8/2012	Reposition 30 AMP Breaker	WGC	
		004	9/24/2015	Clarify Bargemen Ground	WGC	
E-01-C	(Blank in Drawing)	001	8/1/1999	99 Code Change	TJA	Breaker Error
		002	3/6/2001	Remove 8ga Wire	TJA	
			9/8/2003	Drawing Date		
		003	4/2/2009	Added Conv	WGC	
E-01	(Blank in Drawing)		11/14/2003	Drawing Date		Breaker Error
		1	2/11/2006	06’ Print Rev.	EVA	
		2	4/2/2009	Added Conv.	WGC	
		3	3/15/2016	Added Solar Conn.	WGC	
		4	10/31/2017	Rem. Opt. PM Kit. Cir.	WGC	

A. Forest River NHTSA Recall No 24V-395

59. The Partial Recall stems from a failure to comply with the Applicable Standards for numerous years. This section focuses specifically on the material provided for the 5th Wheel travel trailers. Forest River produced at least three electrical wiring schematics (drawing numbers **12-VOLT**, **E-01-C**, and **E-01**) 5th wheel travel trailers related to seven-way wiring.

60. Forest River's own electrical system drawing number **12-VOLT** (ForestRiver0000012), dated June 29, 2000, has a correct electrical system configuration. Thus, Forest River has been in possession and aware of a correct electrical system sketch. At about the same time, Forest River also generated an electrical system drawing number **E-01-C** (drafted on August 1, 1999, and released on September 8, 2003) that was in violation of Applicable Standards. The main difference between a safe and compliant electrical system and a fire hazard can be summarized visually in Figure 9. By enabling an effective material cost saving of ~\$1.01/rv unit (on one 30-amp breaker, 2 screws, and a short 3-inch max length of 10-gauge wire), Forest River has placed and continues to place its customer and the general public in danger.

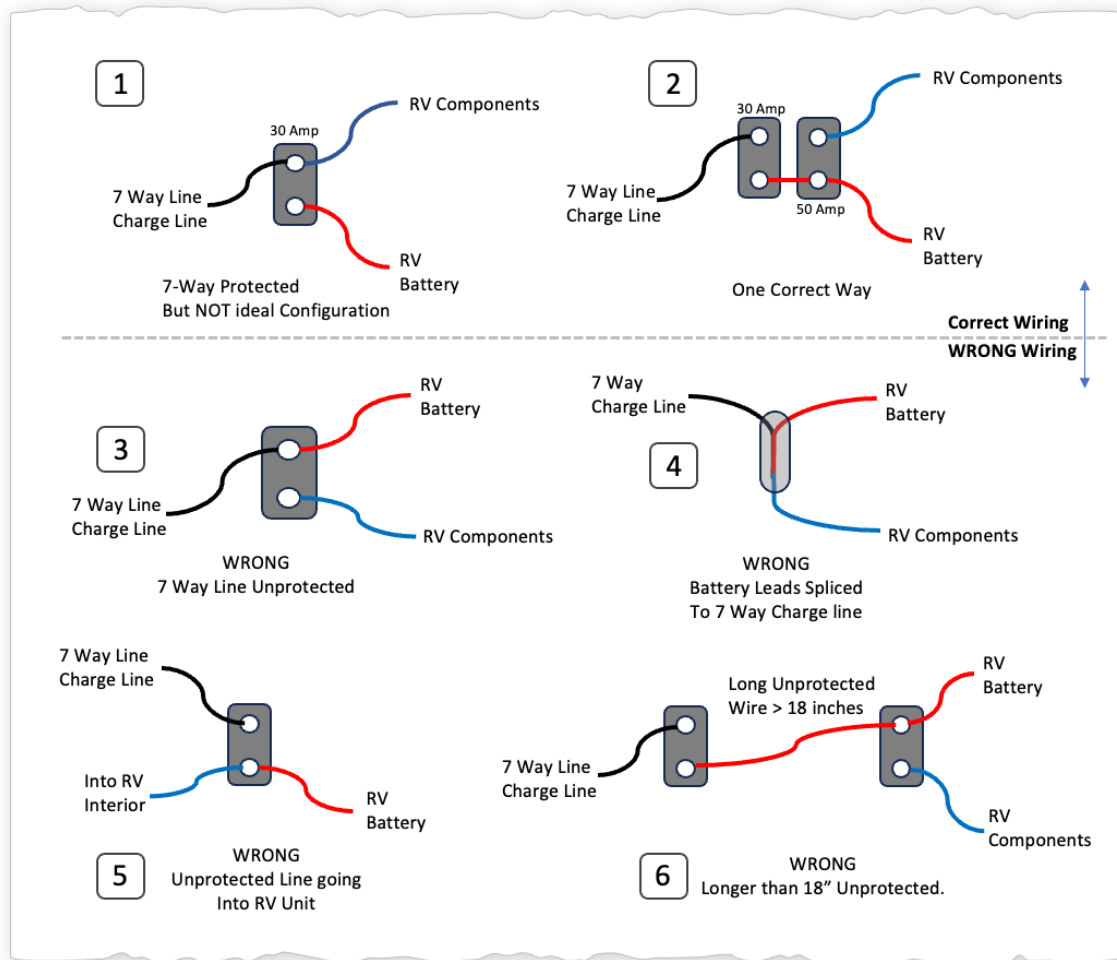


Figure 9. Electrical system wrong way and right way both present in existing Forest River electrical system drawings and Field Investigations. Note that the 7 Way charge line should be protected by a 30-amp breaker since it is a 10-gauge wire.

61. On June 4, 2024, Forest River, Inc. submitted a recall for Cedar Creek from 2004 to 2024 and Puma from 2006 to 2024. Forest River considers the recall a “precautionary measure.”

Description of Defect :

Description of the Defect : The 7-way trailer connector includes wiring for the tow vehicle to charge the trailer batteries when the trailer is connected to the tow vehicle. This circuit is protected by a fuse installed in the tow vehicle. With the tow vehicle disconnected the 7-way does have 12V on the charge line but is not connected to any loads. As a precautionary measure Forest River supplies overcurrent protection from the trailer batteries to the 7-Way connector. The charge wire to the 7-way trailer connector may have been routed to the wrong side of the breaker in the battery compartment.

Figure 10. Defect description of NHTSA Recall No 24V-395

62. The total time allotted for the recall is 0.10 hours (6 minutes). In a Forest River assembly plant, fixing the electrical wiring error while the unit is being assembled may take about 6 minutes. However, based on conversations with dealer service departments and my work on these units, the minimum costs for just determining if a unit is up to applicable standards is between \$100 and \$200 dollars for an RV owner.

63. As demonstrated using physical experiments in Montana unprotected seven-way wiring can result in a fire if there is a short. The field inspection of the 2019 Puma revealed sharp edges and burrs present that, over time, can cut and slice unprotected wire insulation up to the point of generating a short.

64. In June 2024, another RV manufacturer Brinkley RV acknowledge in a recent Recall (24V-476) that “there is an increased risk of thermal event (fire) in an over-current scenario of the unprotected line.” The Brinkley RV recall, like here, is for “lack of overcurrent protection.”

B. Forest River 5th Wheel Wiring Schematics

65. An email from Forest River counsel on August 18, 2023, states that the “12V wiring system and routing of the system is similar in all 5th wheel recreational vehicles assembled and distributed by Forest River.” (Conway Exhibit 15).

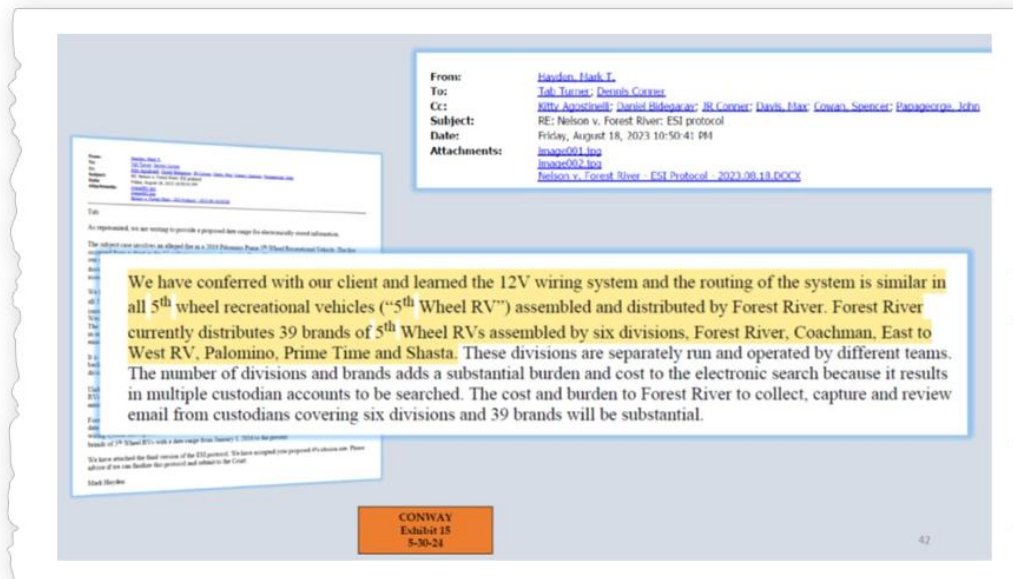
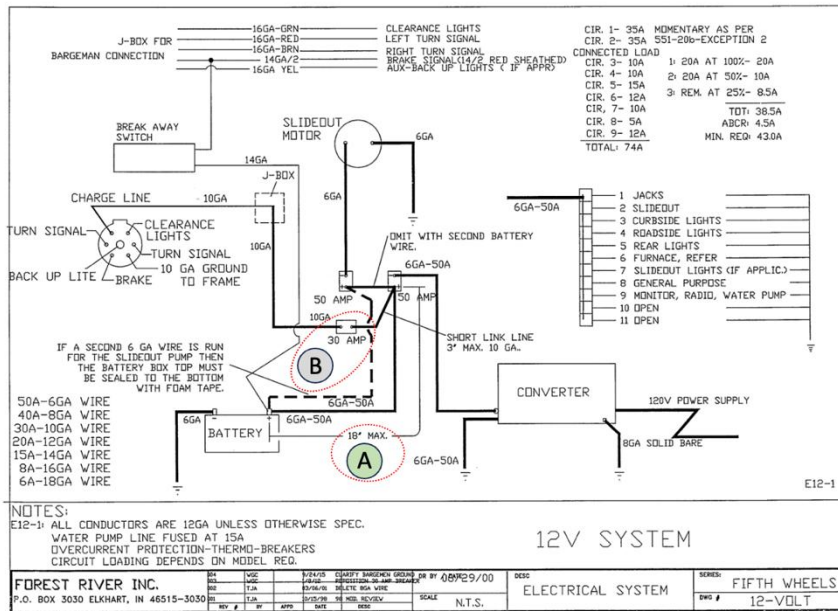


Figure 11. Email from Forest River Counsel Mark Hayden on August 18, 2023

66. Based on the discovery material provided, Forest River has at least three schematic drawings that describe the charge line, breaker, and battery configuration. One drawing (DWG # **12-Volt** for 5th Wheel) was created for submittal purposes only. The other two schematics drawings are DWG # **E-01** and DWG # **E-01-C**. The internal Forest River Electrical Guide (ForestRiver4490-FR5058) has a single convoluted sketch (ForestRiver0005021) that described three methods for seven-way wiring.

67. The first drawing **12-Volt** (Series 5th Wheel), Figure 12, originally dated (6/29/2000) shows that Forest River was in possession and understood the following: A) max battery lead of 18" to a breaker, B) breaker (30 amp) between the charge line and the positive battery terminal, and C) breaker (50 amp) to the slide outs.



A Correctly limit the maximum Length of the Battery to 18" Max Length

B Correctly have a 30 Amp breaker between the charge line and the positive battery terminal

Figure 12. Forest River Electrical System drawing 12-Volt for Fifth Wheels (ForestRiver0000012) was created to make “submittals for Forest River as required by the States, Canada, for certifications approvals” and was “not designed as a production print.”

68. The author of the **12-Volt** (Series 5th Wheel) drawing, Terry J Anderson, stated: “That document is a submittal print that I created to make submittals for Forest River as required by the States, Canada, for certifications approvals” (Anderson Dep. 6:18-21). He further confirms: “I dealt strictly with the submittal aspect and prints that were required by the states (Anderson Dep. 16:17-23).

69. Thus, the drawing **12-Volt** for the electrical system was “not designed as a production print” per Anderson’s deposition (Anderson Dep. 19:13-18), it was for “submittal purposes only” (Anderson Dep. 20:25). Every time that Forest submitted the **12-Volt** (Series 5th Wheel) drawing to states and government entities knowing full well that those were not production drawings, Forest River produced misleading/deceptive information.

70. The second drawing, dated September 8, 2003, is where Forest River starts to produce conflicting information for its electrical system. In drawing **E-01-C** (ForestRiver0020997), Figure 13, for the electrical system the errors begin. A single breaker (50

amps) is used, and the seven-way wiring charge line is directly connected to the positive terminal of the breaker where the battery is connected (label X). Note that the drawing does not specify the series of RV that are impacted by this schematic (label Y). It is also important to note that this is not a draft preliminary drawing since there have been at least three modifications/updates made to the drawing since its initial release date. The last modification for drawing **E-01-C** is dated April 2, 2009.

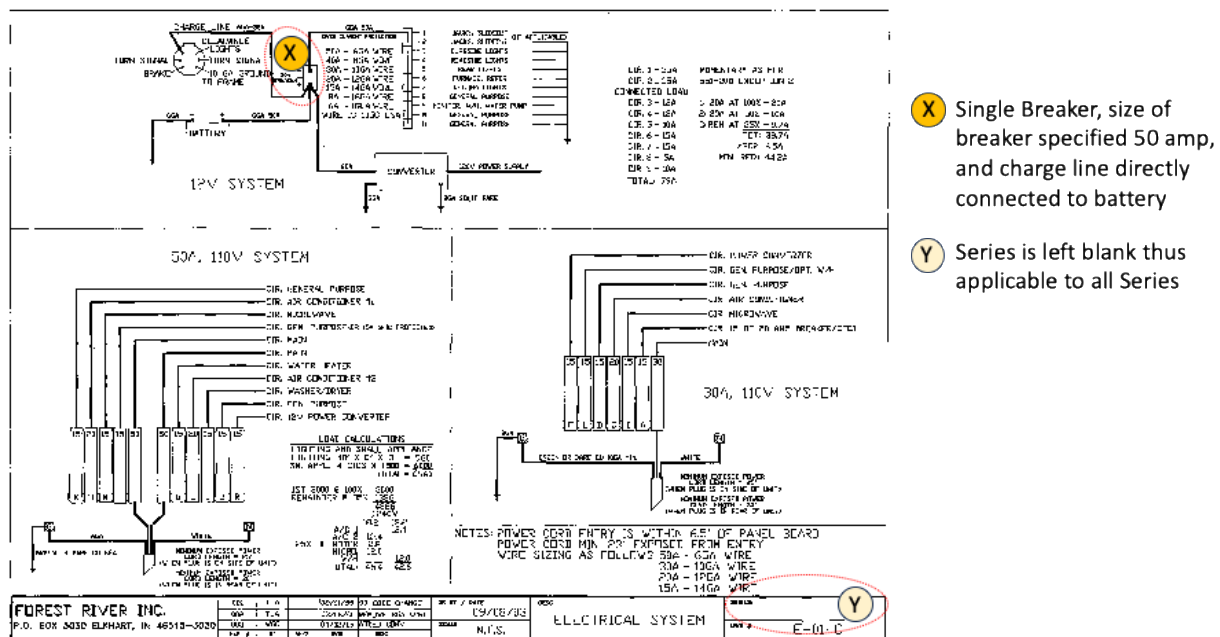


Figure 13. Forest River Electrical System drawing E-01-C. (ForestRiver0020997)

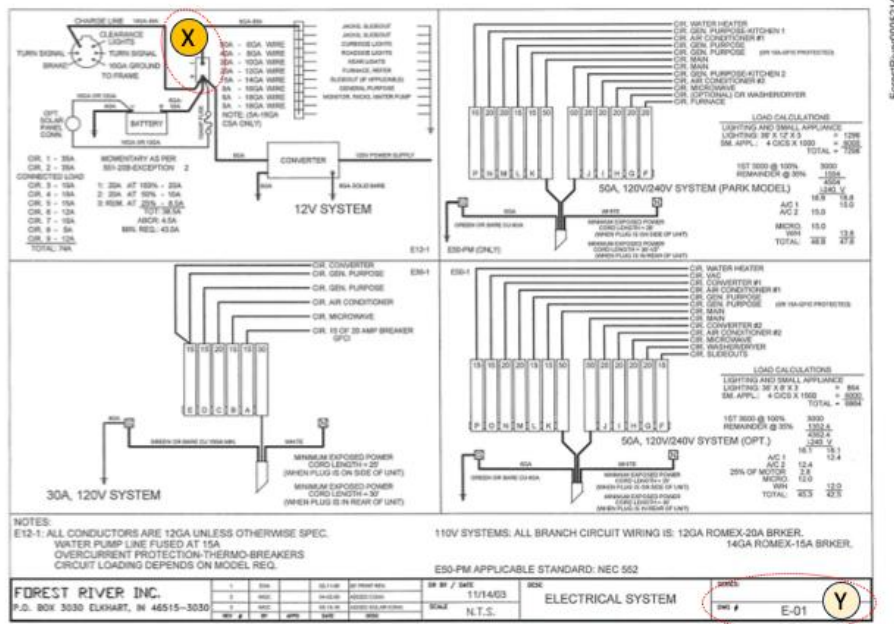


Figure 14. Forest River Electrical System drawing E-01 (ForestRiver0005214)

72. An examination of the history and editing of the three drawings shows that all of the three drawings were modified by three individuals with initials: EVA, TJA, and WGC. Paying particular attention to the last modification dates for each of the three drawings shows that the individual with WGC was aware of the existence and edited drawing 12-Volt on 9/24/2015 and made changes to drawing **E-01** with the wrong wiring diagram on 10/31/2017. A summary of the electrical system edit history of the three provided drawings can be found Table 5.

73. Per William G. Conway's (initials WGC) deposition, who contributed to all three electrical system drawings, neither Conway nor Anderson (initials TJA) were or are engineers. (Conway Dep. 47:15-17)

74. Per Conway's deposition there was no system in place to review or release the electrical schematics. Conway refers to a simple sign off as a "sophisticated" (Conway Dep. 47:24 – 48:2)

Table 5. Modification history of the 3 electrical system drawings (schematics) by Forest River. Electronic Wiring Sketch History Forest River Document (ForestRiver0000012), the second drawing (E-01) described as the electrical system (ForestRiver0005214) shows that the wrong electrical diagram and does not specify the series.

DWG #	Series	MOD #	Date	Designation	Initials	Notes
12-VOLT	Fifth Wheels	001	10/15/1998	98 Mod. Review	TJA	Pass Code
			6/29/2000	Drawing Date		
		002	3/6/2001	Delete 8GA Wire	TJA	
		003	1/8/2012	Reposition 30 AMP Breaker	WGC	
		004	9/24/2015	Clarify Bargemen Ground	WGC	
E-01-C	(Blank in Drawing)	001	8/1/1999	99 Code Change	TJA	Breaker Error
		002	3/6/2001	Remove 8ga Wire	TJA	
			9/8/2003	Drawing Date		
		003	4/2/2009	Added Conv	WGC	
E-01	(Blank in Drawing)		11/14/2003	Drawing Date		Breaker Error
		1	2/11/2006	06' Print Rev.	EVA	
		2	4/2/2009	Added Conv.	WGC	
		3	3/15/2016	Added Solar Conn.	WGC	
		4	10/31/2017	Rem. Opt. PM Kit. Cir.	WGC	

75. Forest River started with the asset purchase of a bankrupt company, Cobra. Conway was part of Cobra and migrated to Forest River with the purchase. Per Conway's own account, they were “just trying to get the company up and running” (Conway Dep. 71:15-20). Changes were made to electrical system drawings, particularly DWG: **12-VOLT** (Series 5th Wheel), with improper revision protocol or documentation. When Conway was asked about the changes, he stated: “not sure why we did that.” (Conway Dep. 55:7-11).

76. One of the most concerning aspects about Forest River is that production drawings do not exist according to Forest River. The schematics, according to Conway, are to be used only as a guide, and it is assumed and “hoped” that the plant manager will ask for

permission to change how to wire units, yet each plant has some discretion on how they wire an RV unit. (Conway Dep. 71:3-17).

77. Based on the deposition of Rodney Smith, who has served as a Code's and Standard inspector starting approximately 2014, there are no other "electrical wiring diagrams applicable to travel trailers other than the 12-Volt wiring schematic." (Smith Dep. 39: 4-21).

78. It was not mandatory to implement/follow the **12-Volt** (Series 5th Wheel) wiring schematic (only made for submission purposes per Anderson Dep. 16:17-23) on the Cedar Creek plants, according to Chapman's testimony. When prompted if it was mandatory for the Cedar Creek factory to follow the 12-Volt wiring schematic, Chapman's response was: "It was not mandatory." (Chapman Dep. 55:14-21).

79. Based on my engineering education, experience, and background in reading/drafting engineering drawings and production drawings, Forest River did not have a sufficient engineering verification and release process for a life-critical component such as the electrical system. Furthermore, both W.G. Conway and T.J. Anderson the Forest River personnel who were charged to "review codes & standards" failed to catch the applicable standards violations in at least 9 different instances. More than a handful of modifications were made between **E-01** and **E-01-C**, none of which required Forest River to determine if said electrical system was in compliance.

80. To further complicate matters, Forest River created another schematic diagram for the "12V system" of the travel trailers with exactly the same drawing number, DWG #12-VOLT (ForestRiver30521), which was provided late in discovery on February 4, 2025. Details of the travel trailer wiring system can be found in the next section.

C. Forest River Travel Trailers Wiring Schematics

81. On February 4, 2025, Forest River counsel produced the electrical system schematic diagram for the travel trailers (ForestRiver0030521).

82. The wiring schematic, also labeled DWG# **12-VOLT** (Series Travel Trailers), clearly shows that there is NO protection on the seven-way wiring as depicted in Figure 15. The 30-amp breaker that exists on the 5th Wheel drawing was removed from the travel trailer drawings.

83. The travel trailer electrical system schematic corroborates Matt Gingerich statement that: “On a travel trailer there is no over-current protection on the charge line.” (M. Gingerich Dep. 20:23-24). Forest River's missing overcurrent protection on the seven-way wiring is a violation of applicable standards.

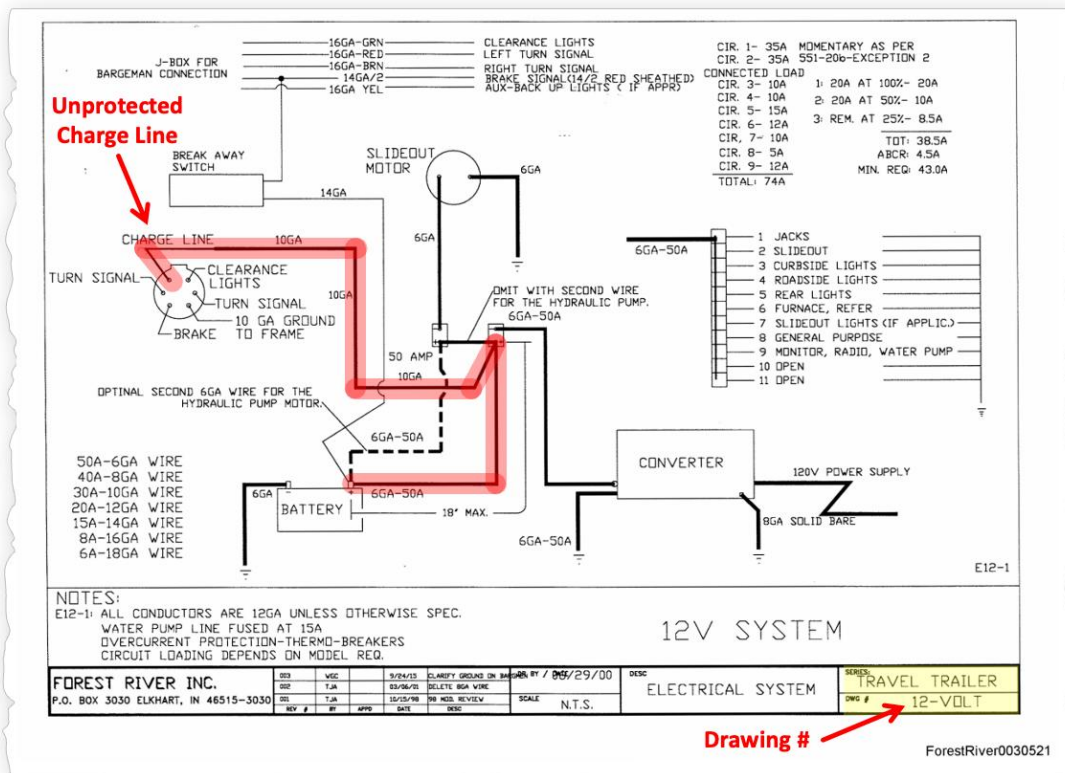


Figure 15. Forest River schematic diagram (ForestRiver0030521) for the travel trailers with the same drawing number (12-VOLT)

84. A side-by-side comparison, Figure 16, of the fifth wheel and travel trailer electrical system unequivocally shows the removal the 30-AMP breaker responsible for overcurrent protection of the charge line has been removed on the travel trailers.

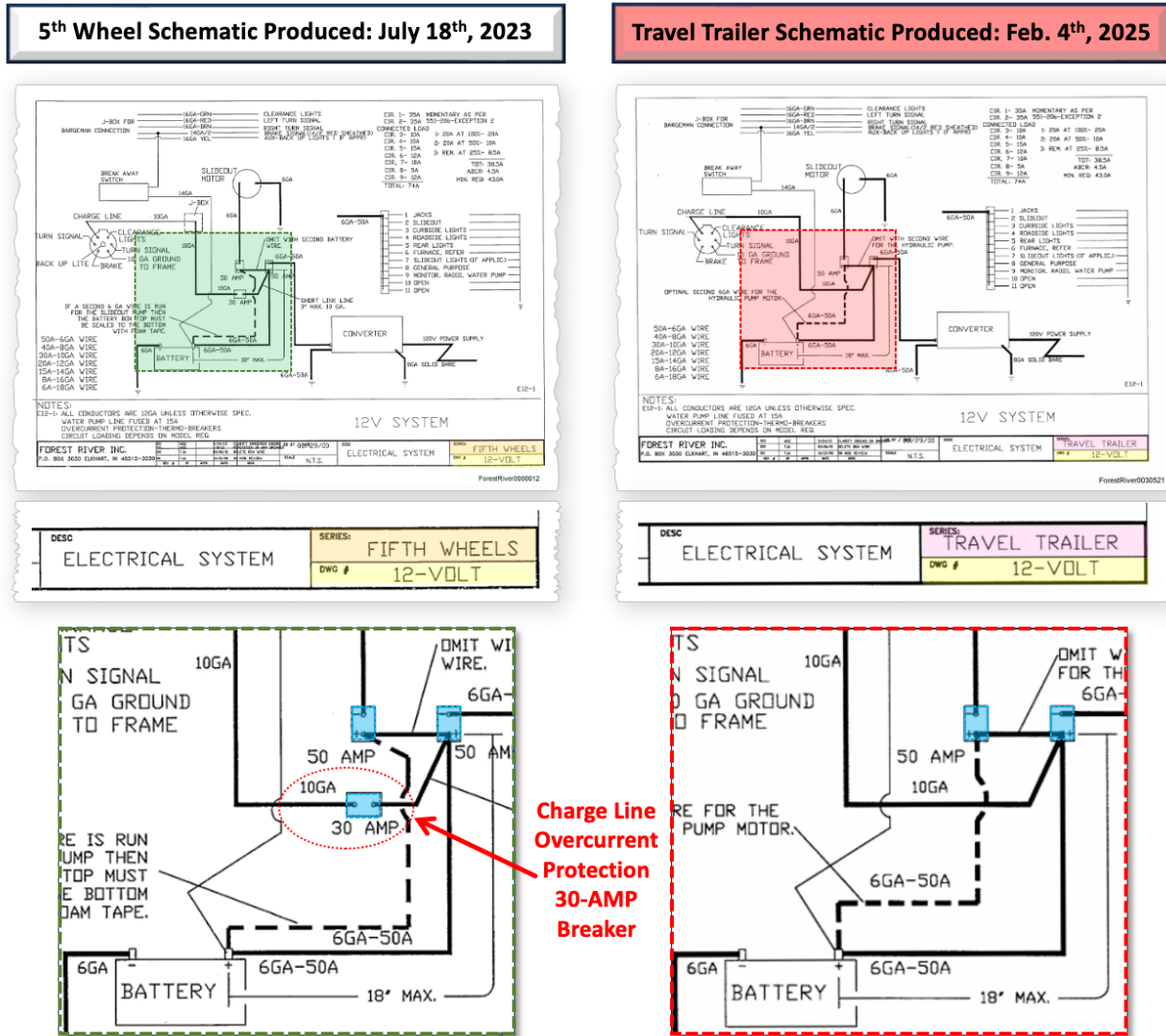


Figure 16. Comparison between 12V Electrical System between Fifth Wheels (ForestRiver0000012) and travel trailer (ForestRiver0030521) schematic diagram

D. Warranty Claims Examples of Overcurrent Protection

85. This section outlines some of the warranty claims that show should have resulted in an in-depth investigation and appropriate recalls.

86. An excerpt of Forest River Warranty Claims shows that Forest River was aware some of the fifth wheels and towable RVs had an issue with no circuit protection at least going back to 2013. It is likely earlier but we do not have discovery information from earlier time frames.

87. The following Forest River models (the year in parenthesis is the priority recall year) have all been flagged due to warranty claims related to the unprotected seven-way wiring: Avenger (2014), Cherokee 5th Wheel (2016), Cherokee Toy Hauler (2013), Columbus (2014), Rockwood 5th Wheel (2012), Vengeance (2015 Major Issues), Sabre (2015), Sanibel (2015).

88. For example, there are several claims related to the unprotected lines of the Columbus 5th Wheel, which include a 2024 claim stating: “*DURING INVESTIGATION THERE WERE NO PROTECTIVE CIRCUIT BREAKERS INSTALLED INLINE WITH THIS CIRCUIT TO PREVENT THIS*” (ForestRiver0030437). In 2014, there was a claim that the “WIRES IN JUNCTION BOX FOR 7 WAY ARE MELTED,” most likely due to the unprotected seven-way wiring. Note that in 2021 Matthew King wife died in a Forest River 2020 Columbus RV fire. The fire investigation was inconclusive due to the significant damage to the RV. As of this report, there is no Columbus recall pertaining to the unprotected seven-way wiring.

89. On February 4, 2025, Forest River warranty claims pertaining to 5th wheel towable RV’s (ForestRiver0030438), summary shown in Table 6. There are two models (Wildwood and Columbus) contained in document ForestRiver0030438 that indicate no over current protection.

90. ForestRiver 0030438 has 20 warranty claims related to the 24V-395 Recall; yet, per the quarterly report for Recall 24V-395 as of October 23, 2024 there have been a total of 1,474 units remedied for the Cedar Creek and Puma. As of October 23, 2024, approximately five

months after the recall, less than 3.6% of the units have been “remedied” (ForestRiver0030437).

One hypothesis for the low number of remedied units is the downplaying that Forest River did on the Recall 24V-395.

Table 6. Limited warranty claims related to 5th wheel trailers for 2024 provided by ForestRiver0030438 disclosures.

Description	Value
Warranty Claims for 5 th Wheel included in document	40
Portion of the Claims related to 24V-395 Recall	20
Portion of warranty claims associated with unprotected seven-way wiring	2
Portion suspected to have issues with unprotected seven-way wiring	2

91. There are other discovery documents that contain warranty data that goes back to 2013. One interesting example to note is a Cherokee Toy Hauler (Model year 2014) claim (ForestRiver30440-30444) where the 7-way cord melted due to no circuit protected charge line is denied by Forest River warranty within 3 months of purchasing the RV. The dealer sold the unit on August 12, 2013 within three months the “7-way cord wires loose & shorted to junction box.” As shown in Figure 17, the Cherokee toy hauler clearly was wired with the charge line having no circuit protection; yet, Forest River took one day to review the warranty claim and “Denied” the Warranty claim. Note that Forest River may have eventually paid for the repair according to ForestRiver0030439.

Date	Entered By	Note Code	Tread Code
11/12/2013	jtezloff		
Claim:WEB1070691 :: Line:A :: Complaint:Customer States: The 7-way cord has melted. Verified. Found 7-way cord wires loose &shorted to junction box. Charge line shorted on the metal j-box. The charge line is connected to the same side of the circuit breaker as the battery cable=no circuit prote :: Repair Code:40-002100 :: Description:Repair 7-Way Cord (tow vehicle power) :: Auth Status:Under Review :: FR Hrs:0.30 :: Req Hrs:3.60 :: Hrs Auth:0.00 :: Note:need pics			
			Auth Status: Under Re
Date	Entered By	Note Code	Tread Code
11/13/2013	jtezloff		
Claim:WEB1070691 :: Line:A :: Complaint:Customer States: The 7-way cord has melted. Verified. Found 7-way cord wires loose &shorted to junction box. Charge line shorted on the metal j-box. The charge line is connected to the same side of the circuit breaker as the battery cable=no circuit prote :: Repair Code:40-002100 :: Description:Repair 7-Way Cord (tow vehicle power) :: Auth Status:Denied :: FR Hrs:0.30 :: Req Hrs:3.60 :: Hrs Auth:0.00 :: Note:needed pics			

Figure 17. Forest River denies warranty claim on unit 3 months from sold to customer with NO circuit protection on seven-way wiring, charge line (ForestRiver0030442). VIN: 4X4FCTH21EY205886

92. As shown in Table 7 there are numerous cases within the limited warranty claim data for towable RV's provided that indicate the long term ongoing systemic problems with the seven-way wiring having NO overcurrent protection going back to at least 2013.

93. The warranty claims also allude to more problems than the seven-way wiring on Forest River products.

Table 7. Forest River Warranty claim excerpts that show that Recall Search is done by entering the VIN on the Forest River Recall Search (search performed on Feb. 4, 2025). The bates number are provided in short hand <FR30439>

Model / Warranty	Date Plant	VIN	Details		Recall Search		Nelson Lawsuit Inv. ID
			OC Issue	Melted Wires	Total	Electrical	
Avenger <Fifth Wheel>	5/27/2014 Plant 50	5ZT3AVUB7DB901944 <FR30439>	YES	YES	0	0	YES
"DEAD SHORT IN CAP BETWEEN JUNCTION BOX AND BREAKER MELTED WHILE WIRING HARNESS C: FROM IMPROPER INSTALLATION FROM MFG"							
Cedar Creek <Fifth Wheel>	10/8/2021 Plant 20	4X4FCRP27MS225453 <FR30074>	YES	YES	1	1 24V-395	YES
"7 WAY PLUG WAS SMOKING WHEN FORKLIFT PLUGGED INTO IT. 7 way shorted."							
Cherokee Toy Hauler <Fifth Wheel>	11/8/2013 Plant 17	4X4FCTH21EY205886 <FR30440-FR30444>			1	1 15V-589	YES **
"The charge line is connected to the same side of the circuit breaker as the battery cable=no circuit protection. The shorted charge line melted into all wires around it to the battery."							
Cherokee <Fifth Wheel>	7/17/2018 Plant 17	4X4FCTH21HY209585 <FR29501-29502>	YES		0	0	YES **
"Charge line from battery comp to wiring box at hitch was wired incorrectly causing wiring to melt and effect electrical system while customer was traveling, by wired incorrectly, it is missing a circuit protection device between the 7-way plug and the battery."							
Columbus <Fifth Wheel>	7/31/2014 Plant 410	4X4FCMN20F6004391 <FR30439>	-	YES	0	0	YES
"WIRES IN JUNCTION BOX FOR 7 WAY ARE MELTED"							
Columbus <Fifth Wheel>	3/27/24 Plant 410	4X4FCMR24N6013815	YES	YES	0	0	YES **
"THIS CAUSED DIRECT SHORT WHEN 12 VOLT CHARGE LINE WAS CUT INTO BY WIRE CLAMP CAUSING DIRECT SHORT WITH NO PROTECTION BUILT INTO CIRCUIT."							
Crusader <Fifth Wheel>	9/30/2016	5ZT3CSBXFG116276 <FR1858-FR1898>	YES	YES	0	0	YES
"The wiring configuration using a 50A Auto-Reset circuit breaker is the most probable origin and the cause for this fire loss."							
Sierra <Fifth Wheel>	8/27/2016 Plant 3	4X4FSEM2XHJ043127 <FR29181>	YES		1 17V756	0	Suspect **
"THERE IS NO CIRCUIT PROTECTION, THE CHARGE LINE GOES RIGHT TO THE BATTERY SIDE LUG"							
Sierra Towable <Fifth Wheel>	8/5/2020 Plant 3	4X4FSEH25MJ048921 <FR29535>	YES		0	0	Suspect
7 WAY INOP, MELTED AT TIP, R/R 7 WAY PLUG POWER CORD, BARGMAN, 8', 7-WAY							
Wildwood 5 th Wheel <Fifth Wheel>	2/14/2024 Plant 69	4X4FWBN26PV708176	YES	YES	0	0	YES
"Auxiliary power wire in junction box for trailer wiring was not installed properly. Came loose and shorted 12 V power to the box"							
XLR Toy Hauler <Fifth Wheel>	7/28/2022 Plant 45	4X4FXLL34NF168803 <FR156>	YES	YES	0	0	YES
"Wires from 7-way melted during diagnosis.... It was also discovered the chassis breakers were installed incorrectly"							
XLR Toy Hauler <Fifth Wheel>	11/10/2016	4X4FXLP38GF161706 <FR1899-FR1900>	YES	YES	0	0	Yes
"claim came in stating wires at J-box for generator caught on fire and melted."							

VIII. FOREST RIVER 2022 SURVEY

A. Forest River 2022 Survey

95. On May 23, 2022, the Nelson Lawsuit was filed with the U.S. District Court of Montana Great Falls. On June 9, 2022, Forest River Inc. was formally served with the Nelson Lawsuit.

96. In June 2022, the 2022 Survey titled “Subject: RV Inspection of Charge Line & Breakaway Switch Wiring” was investigated by Forest River. Between the end of June and the end of July, the data was gathered.

97. The “plant inspectors” of the Office of Codes and Standards (Director Matt Gingerich) participated in collecting the 2022 Survey. The 2022 Survey shows that 39 out of 64 plants, that is over 60% of the plants that replied, had electrical wiring errors. Forest River failed to provide the documents in discovery for 2.5 years in the Nelson Lawsuit. The 2022 Survey only came to light on January 15, 2025, after Rodney Smith’s deposition but were not put into context until Matt Gingerich’s deposition the next morning. In short, Forest River was fully aware of the problem in the summer of 2022.

98. The 2022 Survey “Subject: RV Inspection of Charge Line & Breakaway Switch Wiring” was officially produced by Forest River counsel on February 4th, 2025 (ForestRiver0030448-ForestRiver0030520).

99. The 2022 Survey, example shown in Figure 18, does not reference any of the four electrical wiring schematics discussed in section VII.B of this report. Instead, the 2022 Survey references a single diagram of the Forest River Electrical Guidelines (ForestRiver0005021). Per the sketches drawn by the inspectors and their written statements it is clear that the plant inspectors were aware that there was no over current protection on a number of their products.

Subject: RV Inspection of Charge Line & Breakaway Switch Wiring
 Type Inspected-Circle One: Fifth Wheel / **Travel Trailer** / Tent Camper
 Name of Standards Manager: Garron Anglemeyer
 Plant Number: 45
 Date: 6-28-22

Break-away Switch:

1. Circle the method below the plant is using to power the breakaway switch based on the min. requirements listed on page 32 of the Electrical Guidelines.
 - a. **Method # 1:**
 - b. Method # 2:
 - c. Method # 3:
 - d. If not, explain or sketch a drawing:
2. Check for wire protection along the run. Is the wire protected from sharp edges and from getting pinched?
 - a. Yes or **No**
 - b. If no, what needs to be done to protect the wire.

Charge Line (wire from tow vehicle that charges unit battery):

1. Locate the J Box containing the junction of the bargeman and unit wires.
2. Locate the 10-gauge wire in the bargeman. This is the charge line. Explain or sketch a drawing showing all connection points from the charge line in the J Box to the positive terminal on the battery.
 - a. Include the gauge of wires used in the run.
 - b. Include the type and size of breakers used in the run.

CHARGE LINE IS NOT PROTECTED. CHARGE LINE ENTERS SAME SIDE OF BUSBAR AS BATTERY.
3. Check for wire protection along the run. Is the wire protected from sharp edges and from getting pinched?
 - a. **Yes** or No
 - b. If no, what needs to be done to protect the wire.

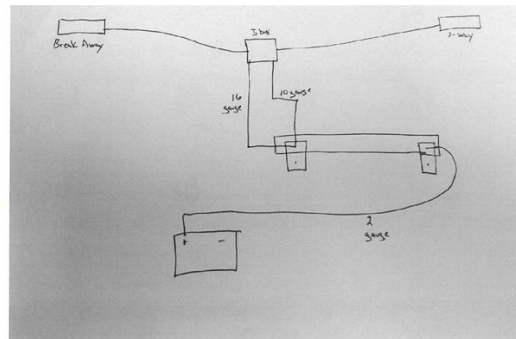


Figure 18. Forest River 2022 Survey sent out the inspectors (ForestRiver0030465)

As part of the Peer Review Evaluation Process (PREP) taught at the Massachusetts Institute of Technology, both Dr. Matthew Angle and I independently evaluated each drawing schematic to determine if the seven-way wiring was protected. We then compared notes and we were in 100% full agreement. The results outlined in

100. show that 55% of the 5th Wheel plants had unprotected wiring, and 62.7% of the travel trailers (travel trailer + destination). All combined more than 60% (39 out of 64) of the plants that replied have the electrical wiring.

Table 8. Summary of the 2022 Forest River Codes & Standards 2022 Survey.

Detail	Travel Trailer + Destination	Campers	5 th Wheels	Responses
Errors w/ 7 Way Charge Line	27	1	11	39
Total Responses	43	1	20	64
% with Wiring Defect	62.7%	100%	55%	61 %

101. Figure 19 shows a visual representation of the 2022 Survey where every vertical orange bar is a plant producing units with unprotected wiring. The red caps are indicators that the data from the Field Investigation performed by Dr. Matthew Angle and I in 2024 also showed the unprotected wiring. Note that although some of the 2022 Survey sketches showed protected wiring, the Field Investigation showed that some of those models were produced with seven-way wiring defects.

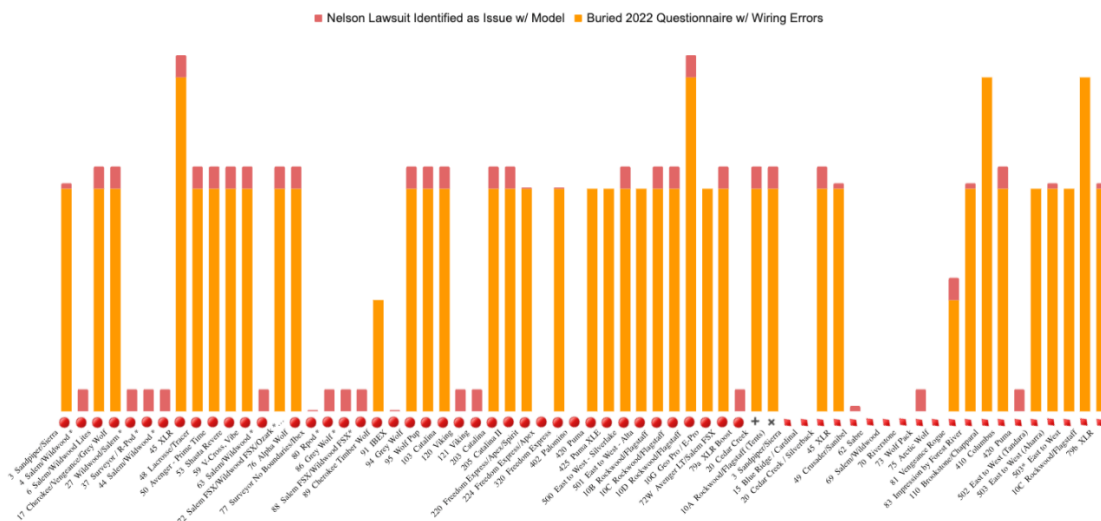


Figure 19. Processed data from the 2022 Survey. The red caps ■ are indicators that the data from the Nelson Lawsuit Field Investigation indicate unprotected wiring in those models. The ‘*’ means that there are several plants producing said model, and the Field Investigation only shows which models have unprotected wiring. Full page image available

see Figure 25. Key: ● Travel trailers, + Tent Campers, ✕ Destination Trailers, and ♦ Fifth Wheel

B. Electrical Guidelines Diagram on Pg 32

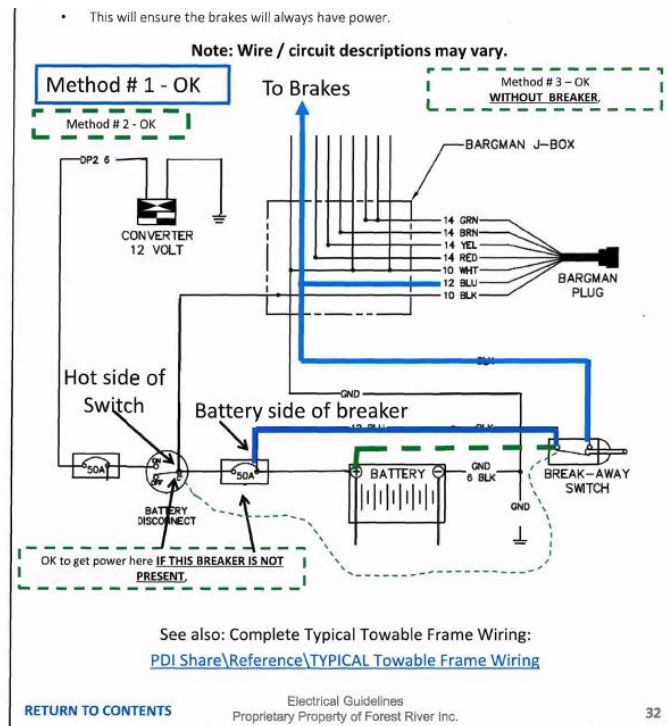
102. The 2022 Survey asks to select the configuration that the “plant is using to power the breakaway switch based on the min. requirements listed on page 32 of the Electrical Guidelines.” (ForestRiver0030448-30520)

103. Figure 20 is an excerpt from page 32 of the Forest River Electrical Guidelines, which is NOT an engineering drawing, engineering schematic, or anything that resembles a production drawing.

104. The sketch also shows how the seven-way wiring. It is critical to note that all of the three methods described on pg. 32 of the Forest River Electrical Guidelines are not up to applicable standards.

105. For Method 1 and Method 2, the breaker closest to the battery is a 50-amp, and it should be a 30-amp to properly protect the seven-way wiring, as shown in Figure 21 and Figure 22 respectively.

106. Method 3, which does not have a breaker between the battery disconnect and battery leaves the seven-way wiring completely unprotected as shown in Figure 23.



ForestRiver0005021

Figure 20. Excerpt from Electrical Guidelines (pg. 32) (ForestRiver0005021) that show Method 1, Method 2, and Method 3 referred to by the 2022 Survey.

Method # 1 - OK

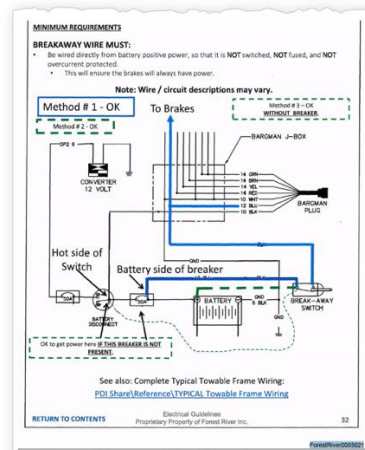
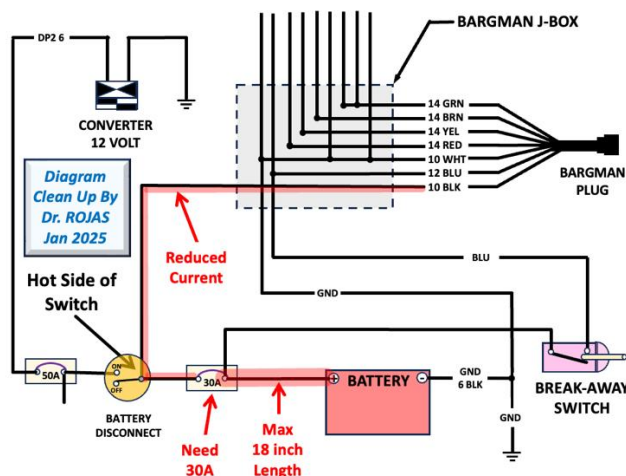


Figure 21. Corrected Method 1 schematic of the Forest River Electrical Wiring Pg 32 with an overlay of the current. The corrections that are needed is changing one of the 50-amp breakers to a 30-amp, and the maximum distance between the battery and the first breaker is 18 inches.

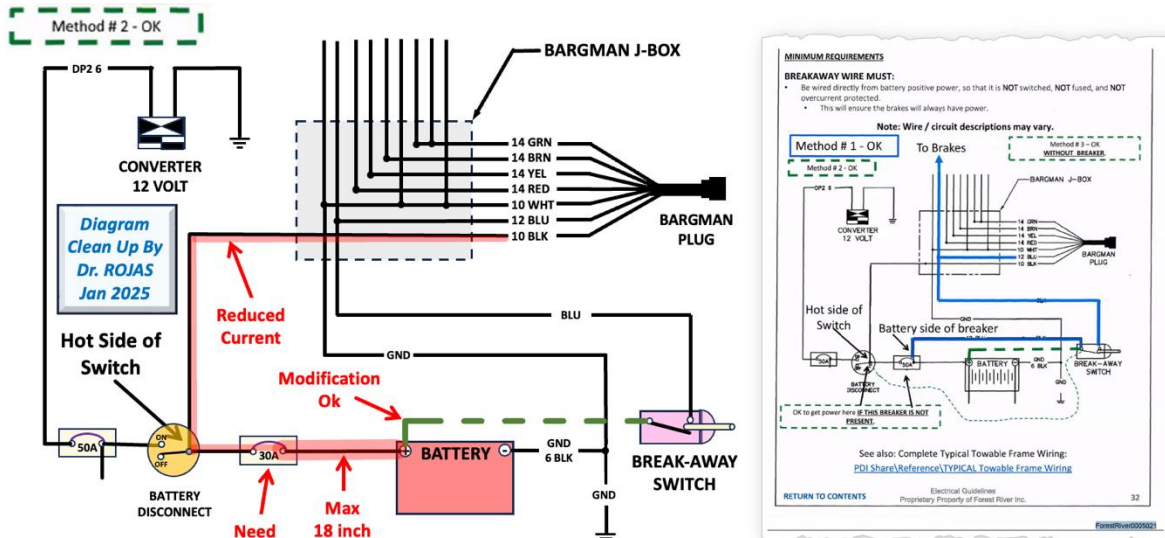


Figure 22. Corrected Method 2 schematic of the Forest River Electrical Wiring Pg 32 with an overlay of the current. The corrections that are needed is changing one of the 50-amp breakers to a 30-amp, and the maximum distance between the battery and the first breaker is 18 inches.

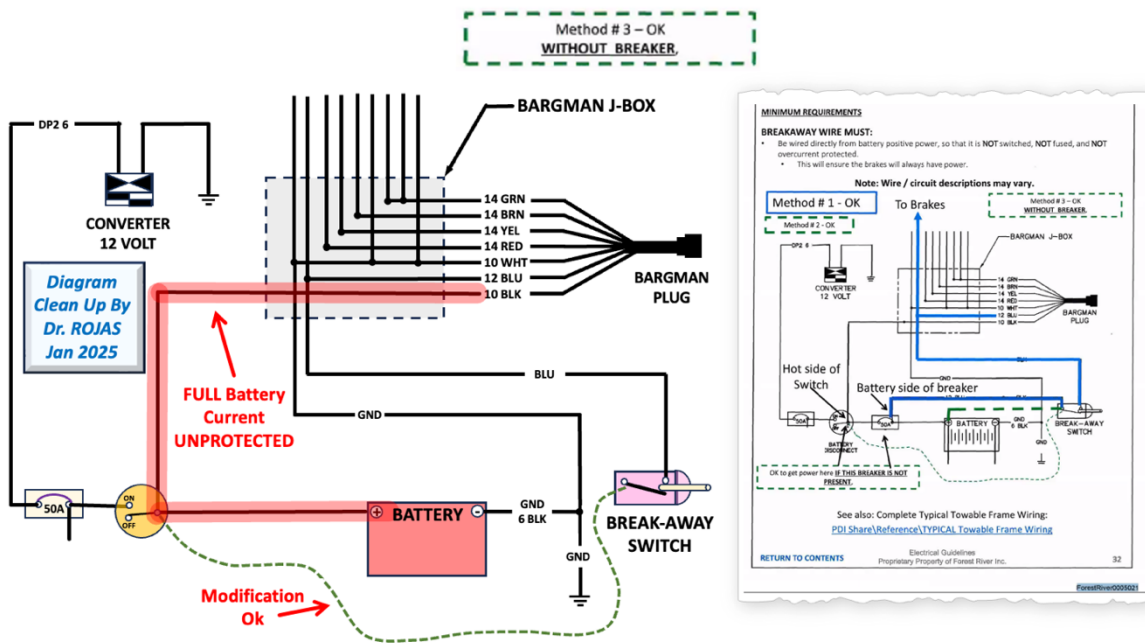


Figure 23. Method 3 schematic of the Forest River Electrical Wiring Pg 32 with an overlay of the current. The way produced it can NOT be corrected by changing a breaker size. This is consistent with some travel trailers where the seven-way wiring is spliced directly to the positive battery terminal.

C. Travel Trailer, Tent Campers, and Destinations Summary of 2022 Survey

107. Figure 24 shows a summarized visual representation of the 2022 Survey for a limited number of travel trailers, tent campers, and destination plants. Note that the 2022 Survey did not extend to all Forest River travel trailer plants.

	Model	Plant	Status Test	FR Status '22	Nelson Lawsuit '24
●	Sandpiper/Sierra	3	FAIL	FAIL	Suspect
●	Salem/Wildwood	4	Cond. Pass	Cond. Pass	FAIL
●	Salem/Wildwood Lites	6	Cond. Pass	Cond. Pass	FAIL
●	Cherokee/Wolf Pup/Grey Wolf	17	FAIL	FAIL	FAIL
●	Wildwood/Salem	27	Cond. Pass	Cond. Pass	FAIL
●	Surveyor / R-Pod	37	Cond. Pass	Cond. Pass	FAIL
●	Salem/Wildwood	44	Cond. Pass	Cond. Pass	FAIL
●	XLR	45	FAIL	FAIL	FAIL
●	Lacrosse/Tracer/Acadia/Wildcat	48	FAIL	FAIL	FAIL
●	Avenger - Prime Time / Navi	50	FAIL	FAIL	FAIL
●	Shasta Revere	53	FAIL	FAIL	FAIL
●	V-Cross, Vibe	59	FAIL	FAIL	FAIL
●	Salem/Wildwood	63	Cond. Pass	Cond. Pass	FAIL
●	Salem FSX/Wildwood FSX/Ozark	72	FAIL	FAIL	FAIL
●	Alpha Wolf / Vengeance	76	FAIL	FAIL	FAIL
●	Surveyor No Boundaries/Ibex	77	Cond. Pass	Cond. Pass	Closed
●	Rpod	80	Cond. Pass	Cond. Pass	FAIL
●	Grey Wolf	86	Cond. Pass	Cond. Pass	FAIL
●	Salem FSX/Wildwood FSX	88	Cond. Pass	Cond. Pass	FAIL
●	Cherokee Timber Wolf	89	FAIL	FAIL	-
●	IBEX	91	Cond. Pass	Cond. Pass	Closed
●	Grey Wolf	94	FAIL	FAIL	FAIL

	Model	Plant #	Status Test	FR Status '22	Nelson Lawsuit '24
●	Wolf Pup	95	FAIL	FAIL	FAIL
●	Catalina	103	FAIL	FAIL	FAIL
●	Viking	120	Cond. Pass	Cond. Pass	FAIL
●	Viking	121	Cond. Pass	Cond. Pass	FAIL
●	Catalina	203	FAIL	FAIL	FAIL
●	Catalina II	205	FAIL	FAIL	FAIL
●	Freedom Express/Apex/Spirit	220	FAIL	FAIL	Closed
●	Freedom Express/Apex	224	Cond. Pass	Cond. Pass	NF
●	Freedom Express	320	FAIL	FAIL	Closed
●	Palomino	402	Cond. Pass	Cond. Pass	NF
●	Puma	420	FAIL	FAIL	NF
●	Puma XLE	425	FAIL	FAIL	-
●	East to West - Silverlake/Della Terra	500	FAIL	FAIL	FAIL
●	East to West - Alta	501	FAIL	FAIL	-
●	Rockwood/Flagstaff	10B	FAIL	FAIL	FAIL
●	Rockwood/Flagstaff	10C	FAIL	FAIL	FAIL
●	Rockwood/Flagstaff	10D	FAIL	FAIL	FAIL
●	Geo Pro / E-Pro	10G	FAIL	FAIL	NF
●	Avenger LT/Salem FSX	72W	FAIL	FAIL	FAIL
●	XLR Boost	79a	Cond. Pass	Cond. Pass	FAIL
✕	Cedar Creek / Silverback	20	FAIL	FAIL	FAIL
+	Rockwood/Flagstaff (Tents)	10A	FAIL	FAIL	FAIL

Figure 24. 2022 Survey for the travel trailers, tent campers, and destination trailers. The status test is a way to measure the number of things that were wrong with the sketch provided for that specific plant. See

for details. Key: ● Travel trailers, + Tent Campers, ✕ Destination Trailers, and 🔥 Nelson Lawsuit Field Investigation identified.

108. The Field Investigation performed for the Nelson Lawsuit shows that many of the travel trailer models inspected have unprotected wiring for the seven-way wiring. According to the Forest River Codes & Standards Director Matt Gingerich: “On a travel trailer there is no over-current protection on the charge line” (Deposition 20:23-24).

109. The Nelson Lawsuit 2024 Field Investigation showed that at least 32 of the 44 plants queried in 2022 by Forest River have unprotected seven-way wiring. At least 72% of the travel trailer plants are producing units with the wrong wiring configuration.

110. Forest River management had known about the faulty wiring since 2022 when they performed a confidential internal investigation and subsequently hid it for 2.5 years.

D. Fifth Wheels Summary of 2022 Survey

111. The following table shows a summarized visual representation of the 2022 Survey for fifth wheel trailers where 60% (12 out of 20) have seven-way wiring violations of applicable standards. Note that the 2022 Survey does not extend to all Forest River fifth wheel plants.

T	Model	Plant #	Status Test	FR Status '22	Nelson Lawsuit '24
♦	Sandpiper / Sierra	3		Pass	NF
♦	Blue Ridge / Cardinal	15		Cond. Pass	NF
♦	Cedar Creek / Silverback	20		FAIL	🔥
♦	XLR	45		FAIL	Suspect
♦	Crusader/Sanibel	49		Cond. Pass	Suspect
♦	Sabre / Vengeance	62		FAIL	NF
♦	Salem / Wildwood	69		Cond. Pass	NF
♦	River Stone	70		Cond. Pass	NF
♦	Wolf Pack	73		Cond. Pass	🔥
♦	Arctic Wolf / Alpha Wolf	75		Cond. Pass	NF
♦	Vengeance Rogue	81		FAIL	🔥
♦	Impression by Forest River	83		FAIL	Suspect
♦	Brook Stone / Chapparal	110		FAIL	NF
♦	Columbus	410		FAIL	🔥
♦	Puma	420		Cond. Pass	🔥
♦	East to West (Tandara)	502		FAIL	NF
♦	East to West (Aharra)	503		FAIL	Suspect
♦	East to West	503*		FAIL	-
♦	Rockwood/Flagstaff	10C		FAIL	NF
♦	XLR Boost	79b		FAIL	Suspect

Last Updated: 1/25/2025



112. For the plants listed the Nelson Lawsuit Field Investigation revealed that at least 5 plants are producing 5th wheels with unprotected seven-way wiring, another 5 plants are suspected, but could not ascertain at the time of inspection.
























E. Data Processing from 2022 Survey

113. The 2022 Survey were initially provided in two separate PDF files, a total of 73 pages.

114. The Table below summarizes the raw data available in the 73 pages (2022 Survey) and into a 5-page table. The models fabricated at each plant (per Forest River Job Listings and PDI inspection reports) were added as well as the specific details that were examined with regards to the seven-way wiring defects. Note that in some cases a 30-amp breaker does not guarantee passing Applicable Standards (see 2022 Survey plant 81 5th wheel Vengeance Roge fails because there is more than 18 inches of length of unprotected wire in violation RVIA LV 3-5), **Error! Reference source not found..**

Plant 81 in Survey with a 30-amp breaker and RVIA LV code violation 3-5

Forest River determined status of code violations. B.D. = Battery Disconnect, 7CL = Charge Line, B.K. = Breaker, W.G. = Wire Gauge. The symbol  shows that there is a battery disconnect present but is being bypassed. The symbol  is that the diagram shows an error in the configuration. The notation “3 → 1” means that the person initially put the method 3 and then corrected to method 1. “Note that for plant 10C we have fifth wheels and travel trailers. Note that the diagrams provided do not have lengths, thus even if a configuration may fail per RVIA LV 3-5 code. Part 1 of 5. (ForestRiver0030448-30520)

Data Extracted from Bates # 30448 to 30520 (Produced Feb 4, 2025)						Test Status			
Type	Plant Bates #	Standards Manager	Method	Wire Protection along Run		Wiring Diagram Evaluation			
				B.A.	C.L.	B.D.	7CL	B.K.	W.G.
Tent Camper	10A 1	Anthony Hasse - 6/28/22 <Rockwood/Flagstaff>	3 → 1	Yes	Yes	OK			OK
2-gauge & 10-gauge wires, smallest breaker is a 100 Amp Breaker between 7way and battery (Automotive Conn.)									
Travel Trailer	10B 2	Anthony Hasse - 6/28/22 <Rockwood/Flagstaff>	3 → 1	Yes	Yes	OK			OK
2-gauge & 8-gauge wires, smallest breaker 40 Amp breaker between 7 way & Battery (twist caps)									
5 th Wheel	10C 3	Anthony Hasse - 6/29/22 <Rockwood/Flagstaff>	3 → 1	Yes	Yes				OK
2-gauge & 8-gauge wires, smallest breaker is 50 Amp (twist caps, bypass battery disconnect, Fundamental Err. Breakers)									
Travel Trailer	10C 4	Anthony Hasse - 6/30/22 <Rockwood/Flagstaff>	3 → 1	Yes	Yes	OK			OK
2-gauge & 8-gauge, smallest breaker 50 Amp (twist cap)									
Travel Trailer	10D 5	Anthony Hasse - 7/1/22 <Rockwood/Flagstaff>	3 → 1	Yes	Yes				OK
2-gauge & 8-gauge, smallest breaker 50 Amp (twist cap)									
Travel Trailer	10G 6	Anthony Hasse - 7/1/22 <GeoPro>	3 → 1	Yes	Yes	OK			OK
2-gauge & 8-gauge, smallest breaker 40 Amp (twist cap)									
Fifth Wheel	410 7	Anthony Hasse - 6/28/22 <Columbus>	1	Yes	Yes	-			OK
6-gauge & 10-gauge, smallest breaker 50 Amp (WAGO Conn.)									
Fifth Wheel	62 8	Doug Earl - 6/29/22 <Sabre/Vengeance>	1	Yes	Yes	-	OK	F	OK
6-gauge & 10-gauge, smallest breaker 30 Amp (Wrong Breaker Configuration) Conditional Pass on Seven-Way.									
Fifth Wheel	110 9	Doug Earl - 6/28/22 <Brook Stone/Chaparral>	1	Yes	NO				OK
6-gauge, smallest breaker 50 Amp (Bypass battery disconnect, J-Box)									
Travel Trailer	420 -	Doug Earl - 6/30/22 <Puma>	1	Yes	Yes	-			OK
6-gauge & 10-gauge, smallest breaker 50 Amp (J-Box)									
Fifth Wheel	420 11	Doug Earl - 6/30/22 <Puma>	1	Yes NO	Yes NO	-	OK	OK	OK
6-gauge & 10-gauge, smallest breaker 50 Amp, 30 Amp Fuse (J-Box) If the total distance between the 30 Amp Fuse and the battery is less 18" PASS									
Travel Trailer	425 -	Doug Earl - 6/27/22 <Puma XLE>	1	Yes	Yes	-			OK
6-gauge & 10-gauge, smallest breaker 50 Amp, (J-Box)									

Continuation part 2 of 5. B.D. = Battery Disconnect, 7CL = Charge Line, B.K. = Breaker, W.G. = Wire Gauge. <Model assumed based on plant>

Data Extracted from Bates # 30448 to 30520 (Produced Feb 4, 2025)						Test Status			
Type	Plant	Standards Manager	Method	Wire Protection along Run		Wiring Diagram Evaluation			
				B.A.	C.L.	B.D.	7CL	B.K.	W.G.
Fifth Wheel	50313	Ed Chupp - 7/11/2022 <Ahara East to West>	Other Wrong	NO Yes	Yes	-	✗	✗	OK
6-gauge, smallest breaker 50 Amp, Note Breakaway is breaker via 50 Amp (J-Box)									
Fifth Wheel	314-15	Garron Anglemeyer - 6/27/2022 <Sandpiper/Sierra>	1	Yes	Yes	OK	OK	OK	OK
10-gauge, smallest breaker 30 Amp, Photo included (J-Box). Breaker in Bus Bar at Battery compartment region.									
Travel Trailer	316-17	Garron Anglemeyer - 6/27/2022 <Sandpiper/Sierra>	1	Yes	Yes	-	✗	✗	OK
10-gauge & 12-gauge, smallest breaker 50 Amp, Photo included (J-Box). If 50 AMP had been a 30 Amp then good.									
Travel Trailer	4518-19	Garron Anglemeyer - 6/28/2022 <XLR>	1	NO	Yes	-	✗	✗	✗
2-gauge, 12-gauge, & 16-gauge, "Charge Line Enters same side of busbar as battery."									
Fifth Wheel	4520-21	Garron Anglemeyer - 6/28/2022 <XLR>	1	Yes	Yes	Ok	✗	✗	Ok
6-gauge, Resettable 80 Amp Breaker, smallest breaker 50 Amp. Photo included. (J-Box) Breakaway Direct Ok.									
Fifth Wheel	8122-23	Garron Anglemeyer - 6/29/2022 <Vengeance Rogue>	1	Yes	Yes	Ok	✗	Ok	Ok
2-gauge & 10-gauge, 120 Amp resettable, smallest breaker 30 Amp Photo. (J-Box). 30 Amp breaker inside Goose Neck.									
Fifth Wheel	73	Jim Harris - 6/29/2022 <Wolf Pack/Vengeance/XLR Boost>	3	Yes	-	-	Ok	Ok	Ok
2-gauge & 10-gauge. Smallest breaker 30 Amp. If the distance between the 30 Amp and the battery is less than 18" PASS									
Fifth Wheel	7525	Jim Harris - 6/27/2022 <Cherokee Arctic Wolf/Alpha Wolf>	3	Yes	Yes	Ok	Ok	Ok	Ok
6-gauge & 10-gauge. Smallest breaker 30 Amp. If the distance between the 30 Amp and switch is less than 18" PASS									
Travel Trailer	76-	Jim Harris - 6/27/2022 <Cherokee Alpha Wolf/Vengeance>	3	Yes	Yes	Ok	✗	✗	Ok
6-gauge & 10-gauge. Smallest breaker 30 Amp going to "DP," 7-Way Charge Line connected to HOT side of Switch.									
Travel Trailer	86-	Jim Harris - 6/27/2022 <Cherokee Grey Wolf>	1	Yes	Yes	-	Ok	Ok	Ok
10-gauge. Smallest Breaker 30 Amp. If the distance between the 30 Amp and switch is less than 18" PASS									
Travel Trailer	8928	Jim Harris - 6/29/2022 <Cherokee Timber Wolf>	1	Yes	Yes	-	✗	?	Ok
10-gauge. Breaker size unspecified. If 30 Amp then Pass.									
Travel Trailer	7729	John Miller - 7/13/2022 <Surveyor No Boundaries/IBEX>	2	Yes	Yes	-	Ok	Ok	Ok
10-gauge. Smallest breaker 30 Amp. If the distance between the 30 Amp and the battery is less than 18" PASS									
Travel Trailer	80-	John Miller - 7/13/2022 <R-Pod>	2	-	-	-	Ok	Ok	Ok
10-gauge. Smallest breaker 30 Amp. If the distance between the 30 Amp and switch is less than 18" PASS									
Travel Trailer	9131	John Miller - 7/1/2022 <lbex>	2	Yes	Yes	-	Ok	Ok	Ok
10-gauge. Smallest breaker 30 Amp. If the distance between the 30 Amp and the battery is less than 18" PASS									

Continuation part 3 of 5. B.D. = Battery Disconnect, 7CL = Charge Line, B.K. = Breaker, W.G. = Wire Gauge. <Model assumed based on plant>

Data Extracted from Bates # 30448 to 30520 (Produced Feb 4, 2025)						Test Status			
Type	Plant	Standards Manager	Method	Wire Protection along Run		Wiring Diagram Evaluation			
				B.A.	C.L.	B.D.	7CL	B.K.	W.G.
Travel Trailer	120 32	John Miller - 6/29/2022 <Viking (Tent campers)>	1	Yes	Yes	-	Ok	Ok	Ok
10-gauge. Smallest breaker 30 Amp. If the distance between the 30 Amp and switch is less than 18" PASS									
Travel Trailer	121 33	John Miller - 6/29/2022 <Viking (Travel Trailers)>	1	Yes	Yes	-	Ok	Ok	Ok
10-gauge. Smallest breaker 30 Amp. If the distance between the 30 Amp and switch is less than 18" PASS									
Travel Trailer	402 34	John Miller - 6/28/2022 <Palomino>	1	Yes	Yes	-	Ok	Ok	Ok
10-gauge. Smallest breaker 30 Amp (Assume across). If the distance between the 30 Amp and battery is less than 18" PASS									
Fifth Wheel	15 35-36	Owen Brown - 6/30/2022 <Cardinal>	2	Yes	Yes	-	Ok	Ok	Ok
1-gauge, 6-gauge, & 10-gauge. Smallest Breaker 30 Amp (J-Box) If the distance between the 30 Amp and battery is less than 18" PASS									
Travel Trailer	79a 37-38	Owen Brown - 6/29/2022 <XLR>	3	Yes	Yes	Ok	Ok	Ok	Ok
6-gauge, 10-gauge. Smallest breaker 30 Amp. (J-Box) If the distance between the 30 Amp and battery is less than 18" PASS									
Fifth Wheel	79b 38-39	Owen Brown - 6/29/2022 <XLR>	3	Yes	Yes	Ok	✗	✗	Ok
6-gauge, 10-gauge. Smallest breaker 50 Amp. (J-Box)									
Travel Trailer	4 1	Paul Hasse - 7/6/2022 <Salem/Wildwood>	3 → 3	Yes	Yes	-	Ok	Ok	Ok
6-gauge, Smallest Breaker 30 Amp (J-Box) If the distance between the 30 Amp and battery is less than 18" PASS									
Travel Trailer	6 2	Paul Hasse - 7/6/2022 <Salem/Wildwood Lites>	3	Yes	Yes	Ok	✗	✗	Ok
6-gauge, 10-gauge, & 14 gauge. Smallest Breaker 30 Amp. (J-Box). 50 Amp is between junction box and the battery disconnect. There is a green line with a 30A breaker (suspect solar)									
Travel Trailer	27 3	Paul Hasse - 7/6/2022 <Salem/Wildwood Limited Edition>	3	Yes	Yes	Ok	Ok	Ok	Ok
6-gauge, 8-gauge, & 14-gauge. Smallest breaker 30 Amp. (J-Box). If the distance between the 30 Amp and battery is less than 18" the PASS									
Travel Trailer	44 4	Paul Hasse - 7/6/2022 <Salem/Wildwood>	3 → 1	Yes	Yes	Ok	Ok	Ok	Ok
6-gauge, 10-gauge, 14-gauge. Smallest Breaker 30 Amp (J-Box). Junction Box interior inferred: 7Way 10g Blk to 10g Blk. And 14g Purple to 14g orange, and 14g Blk to 7Way. If the distance between the 30 Amp and battery is less than 18" PASS.									
Travel Trailer	63 5	Paul Hasse - 7/6/2022 <Salem/Wildwood>	3	Yes	Yes	Ok	Ok	Ok	Ok
6-gauge, 8-gauge, 14-gauge. Smallest Breaker 30 Amp. (J-Box) If the distance between the 30 Amp and battery is less than 18"									
Fifth Wheel	69 6	Paul Hasse - 7/1/2022 <Salem/Wildwood>	1	Yes	Yes	Ok	Ok	Ok	Ok
6-gauge, 10-gauge. Smallest Breaker 30 Amp. If the distance between the 30 Amp and battery is less than 18" then PASS									
Travel Trailer	48 7-8	Robert Johnson - 6/28/2022 <Lacrosse/Tracer/Acadia/Wildcat>	1	Yes	Yes	-	✗	✗	Ok
6-gauge, & 10-gauge, Smallest Breaker 50 Amp. (J-Box) Junction Box does not seem to contain a breaker.									

Continuation part 4 of 5. B.D. = Battery Disconnect, 7CL = Charge Line, B.K. = Breaker, W.G. = Wire Gauge. <Model assumed based on plant>

Data Extracted from Bates # 30448 to 30520 (Produced Feb 4, 2025)						Test Status			
Type	Plant	Standards Manager	Method	Wire Protection along Run		Wiring Diagram Evaluation			
				B.A.	C.L.	B.D.	7CL	B.K.	W.G.
Fifth Wheel	49 9-10	Robert Johnson – 6/28/2022 <Crusader/Sanibel/Wildcat/Impression/Fury>	1	Yes	Yes	-	Ok	Ok	Ok
6-gauge, & 10-gauge, Smallest Breaker 30 Amp. (J-Box). If the distance between 30 Amp and battery is less than 18” PASS									
Travel Trailer	50 11-12	Robert Johnson – 6/28/2022 <Avenger/Navii>	1	Yes	Yes	-	✗	✗	Ok
6-gauge & 10-gauge. Smallest Breaker 30 Amp. (J-Box) No Breaker between Battery & 7-Way Charge Line									
Travel Trailer	53 13-14	Robert Johnson – 6/29/2022 <Shasta>	1	Yes	Yes	-	✗	✗	Ok
10-gauge, 16-gauge, (J-Box) (J-Box) No Breaker between Battery & 7-Way Charge Line									
Fifth Wheel	20 15	Brent Chapman – 7/29/2022 <Cedar Creek/Silverback>	1	Yes	Yes	-	✗	✗	Ok
2-gauge & 6-gauge. Smallest Breaker 50 Amp. (J-Box). Comment: “No OCP on charge line.”									
Travel Trailer	37 16	Shae Manqus – 7/29/2022 <Surveyor/R-Pod>	2	Yes	Yes	Ok	Ok	Ok	Ok
6-gauge, If the distance between the 30 Amp and battery is less than 18”									
Dest. Trailer	20 17	Brent Chapman – 7/29/2022 <Cedar Creek/Silverback>	1	Yes	Yes	-	✗	✗	Ok
6-gauge, 10-gauge. Smallest Breaker 50 Amp. (J-Box)									
Fifth Wheel	70 18	David Slabaugh – 7/29/2022 <River Stone>	1	Yes	Yes	-	Ok	Ok	Ok
2-gauge & 10-gauge, Smallest Breaker 30 Amp. If the distance between 30 Amp and battery is less than 18” PASS									
Travel Trailer	72 19	Valentina Sloone – 7/29/2022 <Salem FSX/Wildwood FSX/Ozark>	1	Yes	Yes	✗	✗	✗	Ok
6-gauge, 10-gauge. Smallest Breaker 30 Amp. Both Battery Disconnect and 30 Amp breaker are bypassed. (J-Box)									
Travel Trailer	72W 20	Zulema Flores – 7/29/2022 <Avenger LT/Salem FSX/Wildwood FSX/Ozark>	1 & 2	Yes	Yes	-	✗	✗	Ok
6-gauge, 10-gauge. Two Examples. Both bypassed 30 Amp breaker. (J-Box)									
Travel Trailer	500 21	(Ronnie R.) – (NOT Dated) <Della Terra/Silver Lake>	1	Yes	Yes	Ok	✗	✗	Ok
6-gauge. Smallest Breaker 50 Amp inside 4x4 J-Box									
Travel Trailer	501 22	(Ronnie R.) – (NOT Dated) <Alta – East to West>	1	Yes	Yes	Ok	✗	✗	Ok
6-gauge, Smallest Breaker 50 Amp inside 4x4 J-Box									
Fifth Wheel	502 23	(Ronnie R.) – (NOT Dated) <Tandara – East to West>	D	Yes	Yes	-	✗	✗	Ok
6-gauge									
Fifth Wheel	503 23	(Ronnie R.) – (NOT Dated) <Ahara - East to West>	-	-	-	-	✗	✗	Ok
6-gauge, 8-gauge. Bypass 30 Amp Breaker (J-Box)									
Travel Trailer	59 24	Scott Simerman – (NOT Dated) <Vibe>	-	-	-	-	✗	✗	Ok
6-gauge, 10-gauge. Bypass 30 Amp Breaker (J-Box)									

Continuation part 5 of 5. B.D. = Battery Disconnect, 7CL = Charge Line, B.K. = Breaker, W.G. = Wire Gauge. <Model assumed based on plant>

Data Extracted from Bates # 30448 to 30520 (Produced Feb 4, 2025)						Test Status			
Type	Plant	Standards Manager	Method	Wire Protection along Run		Wiring Diagram Evaluation			
				B.A.	C.L.	B.D.	7CL	B.K.	W.G.
Fifth Wheel	83 24	Scott Simerman – (NOT Dated) <Impression>	-	-	-	-	✗	✗	Ok
6-gauge, 8-gauge. Bypass 30 Amp Breaker (J-Box)									
Travel Trailer	17 25	Steve Gaby – 6/27/2022 <Cherokee>	1	Yes	Yes	-	✗	✗	Ok
6-gauge, 10-gauge. Bypass Breaker unspecified Amp rating (J-Box)									
Travel Trailer	88 26	Steven Gaby – 7/12/2022 <Salem FSX/Wildwood FSX>	3	Yes	Yes	Ok	Ok	Ok	Ok
6-gauge & 10-gauge. Smallest breaker 30 Amp (J-Box) If the distance between 30 Amp and battery is less than 18" PASS									
Travel Trailer	94 27	Steven Gaby – 6/29/2022 <Grey Wolf>	1	Yes	Yes	-	✗	✗	Ok
6-gauge, 8-gauge. Bypass 30 Amp Breaker (J-Box)									
Travel Trailer	95 28	Steven Gaby – 6/28/2022 <Wolf Pup>	1	Yes	Yes	-	✗	✗	Ok
6-gauge, 10-gauge. Bypass 30 Amp Breaker (J-Box)									
Travel Trailer	103 29	Todd Tyler – 6/28/2022 <Catalina>	3	Yes	Yes	Ok	✗	✗	Ok
6-gauge, 10-gauge. Bypass 30 Amp Breaker (J-Box)									
Travel Trailer	203 30	Todd Tyler – 6/28/2022 <Catalina>	3 → 2	Yes	Yes	Ok	✗	✗	Ok
6-gauge, 8-gauge. Bypass 30 Amp Breaker (J-Box). There is a 6-gauge protected by 30 Amp breaker going to diesel pusher (DP)									
Travel Trailer	205 31	Todd Tyler – 6/30/2022 <Catalina>	3	-	-	Ok	✗	✗	Ok
6-gauge, 10-gauge. Bypass Breakers (J-Box) (Partial)									
Travel Trailer	220 32	Todd Tyler – 6/29/2022 <Freedom Express>	3	Yes	Yes	Ok	✗	✗	Ok
6-gauge, 10-gauge. Smallest Breaker 50 Amp (J-Box)									
Travel Trailer	224 -	Todd Tyler – 6/28/2022 <Freedom Express/Apex>	1	Yes	Yes	Ok	Ok	Ok	Ok
6-gauge & 10-gauge. Smallest breaker 30 Amp (J-Box) If the distance between 30 Amp and battery is less than 18" PASS									
Travel Trailer	320 -	Todd Tyler – 6/29/2022 <Freedom Express>	3	Yes	Yes	Ok	?	?	Ok
6-gauge & 10-gauge. Smallest breaker 50 Amp (J-Box) Bottom Section to Breakaway and 7Way not shown.									

The data from the

115. can be visualized as columns as shown in Figure 25 (large size). Each vertical orange column is a plant with one or more code violations with the seven-way wiring.

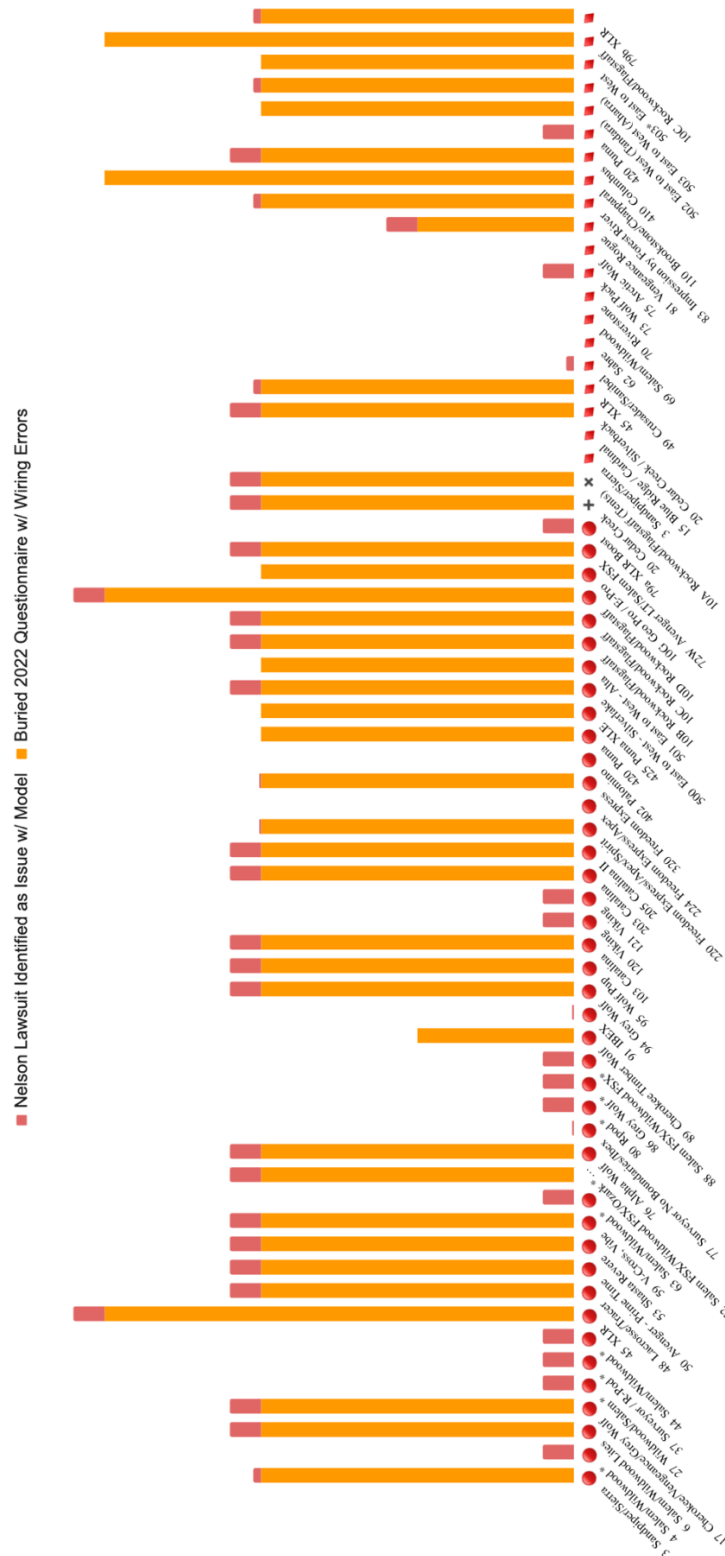


Figure 25. 2022 Survey Results in large columns format. Key: ● Travel trailers, + Tent Campers, ✕ Destination Trailers, ◆ Fifth Wheel, and ■ Nelson Lawsuit Field Investigation identified.

IX. FIELD INVESTIGATION SUMMARY

116. From September 13 to December 28, 2024, over 400 Forest River RV units (5th Wheel, Toy Haulers, Campers, and Destination Trailers) were examined (referred to as the “Field Investigation”). In the Investigation 96 Forest River Models were examined, ~11 of those models had closed bottoms; thus, we were only able to inspect 85 Models. Just in those units inspected we have over 200 RV units in the public domain with the same seven-way wiring defect of the Cedar Creek and Puma (See Appendix C for list). Only 5 of the units were Cedar Creek and another 5 were Forest River Puma’s; therefore, the Field Investigation revealed over 200 RV units with the incorrect wiring across over 50 models. The Field Investigation also revealed that 47 of those units were manufactured by Forest River after June 4, 2024 (submission date of the NHTSA Recall No 24V-395). The 47 units were manufactured in 10 different cities in the following states: California, Indiana, Michigan, and Oregon (See list in Appendix C). Figure 26 shows the number of RV units inspected and the number of units with the unprotected seven-way wiring as a function of fabrication year.

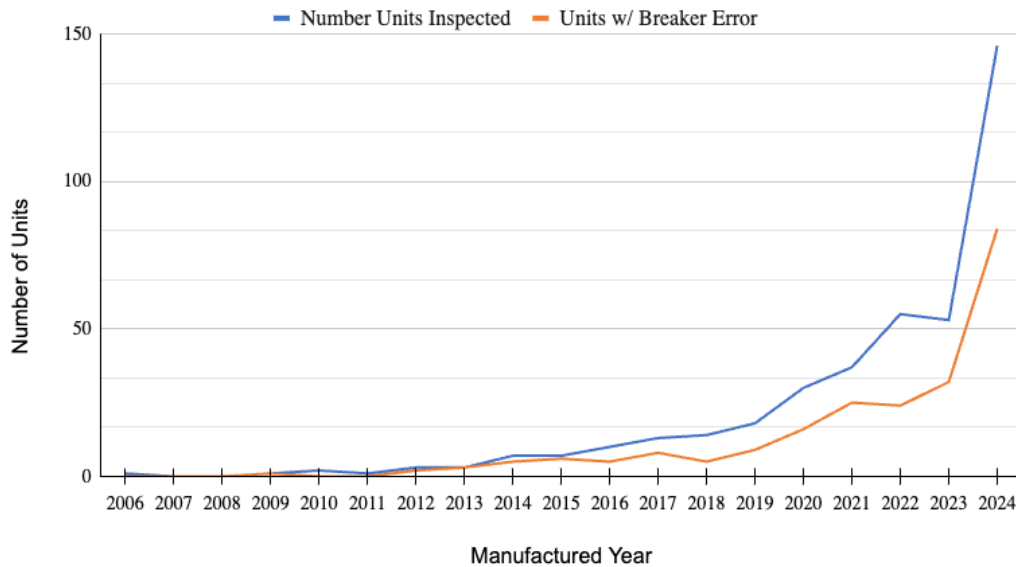


Figure 26. RV Investigation units per manufactured year

117. There are at least 10 plants in 10 different cities that continue to produce RV units after the June 4, 2024, recall, with seven-way wiring defects.

118. The Field Investigation for the Nelson Lawsuit showed that about 60% (50 Models out 85 models inspected) have the unprotected wiring, with five more models suspected to have the seven-way wiring defect. The result from the Field Investigation agrees with the 2022 Survey results that show more than 60% (39 out of 64) of the plant responses were assembling towable RV with seven-way wiring defects.

A. HEAT Map of Seven-Way Wiring Defects

119. A comprehensive list of Forest River RV model offerings is shown in **Error! Reference source not found.**, separated by division and model type. To visualize the prevalence of the Forest River seven-way wiring violations of applicable standards, colors were added to the list of Forest River RV model offerings as shown in **Error! Reference source not found.** Ideally all of the models should have a green color indicating that the inspection test passed. However, the number of models with seven-way wiring defects is more than those where the

inspection passed. The heat map visualizes the gravity and extent of Forest River's seven-way wiring defects.

120. The way to read the heat map can be found in Figure 27.

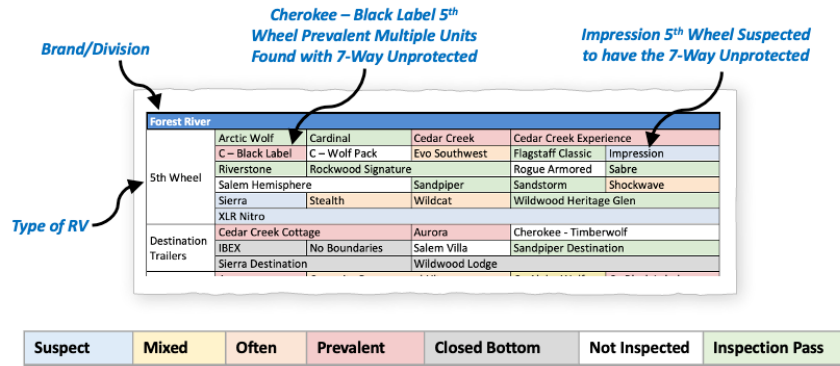


Figure 27. Heat map interpretation quick guide

Forest River models for divisions. (C = Cherokee, F = Flagstaff, R = Rockwood, W = Wildwood)

Forest River					
5th Wheel	Arctic Wolf	Cardinal	Cedar Creek	Cedar Creek Experience	
	C – Black Label	C – Wolf Pack	Evo Southwest	Flagstaff Classic	Impression
	River Stone	Rockwood Signature		Rogue Armored	Sabre
	Salem Hemisphere		Sandpiper	Sandstorm	Shockwave
	Sierra	Stealth	Wildcat	Wildwood Heritage Glen	
	XLR Nitro				
Destination Trailers	Cedar Creek Cottage		Aurora	Cherokee - Timberwolf	
	IBEX	No Boundaries	Salem Villa	Sandpiper Destination	
	Sierra Destination		Wildwood Lodge		
Travel Trailers	Aurora	Campsite Reserve, and Ultra		C - Alpha Wolf	C - Black Label
	C - Grey Wolf	C - Wolf Den	C - Wolf Pack	C - Wolf Pup	Evo
	Flagstaff Campers (3)		F - Travel	Flagstaff E-Pro	Flagstaff Micro Lite
	F - Shamrock	F - Super Lite	Grand Surveyor	Ibex	Nightfall
	No Boundaries	Ozark	R -Campers (3)	R - Geo Pro	R - Mini Lite
	R - Roo	R – Sign. Travel	R - Ultra Lite	Rogue Armored	Rogue SUT
	R-Pod	Salem	S - Cruise Lite	S - FSX	Sandstorm
	S - Hemisphere Travel Trailers		Shockwave	Stealth	V-Trec Camper
	Surveyor Legend, and Legend X		Vibe	Viking Camping Trailers	
	Viking ROK	V - Travel Trailers	Wildcat Travel Trailers		Wildwood
	W - FSX	W - Heritage Glen		W - X-Lite	Work and Play
	XLR Boost	XLR Hyperlight			
	Unlisted	Aviator	Blue Ridge	Cascade	C - Patriot
Independence Trail		Rainer	Sonoma	Trilogy	
True North Ice lodge		Vengeance	V-Cross		

Coachmen					
5th Wheel	Brookstone	Chaparral, and Chaparral Lite			
Trailers	Adrenaline	Apex Nano, and Apex Ultra-Lite		Catalina Destination Series	
	Catalina Expedition, Legacy, Summit Series 7, Summit Series 8, and Trail Blazer				
	Clipper Rok	Clipper Travel Trailers		Freedom Express Select	
	Northern Spirit, Spirit Bijou, Spirit DLX & Compact, Spirit XTR				Remote
East to West					
5th Wheel	Ahara	Blackthorn	Takoda	Tandara	
Trailers	Alta	Della Terra	Longitude	Silver Lake	
Palomino					
5th Wheels	Columbus	Puma	River Ranch		
Trailers etc.	Camping Edition by Puma		Palomini	Palomino O.V.E.	Pause
	Puma	Puma Destination, Ultra Lite, Unleashed			Real-Lite Mini
	Revolve	Solaire Ultra Lite			
Prime Time					
5th Wheel	Crusader	Sanibel	Spartan (NL)		
Trailers	Avenger	Tracer	Lacrosse		
Shasta					
5th Wheel	Phoenix				
Trailers	Shasta, I-5 Edition & Compact				

Forest River heat map that shows the Breaker Error. (C = Cherokee, F = Flagstaff, R = Rockwood, W = Wildwood)

Forest River					
5th Wheel	Arctic Wolf	Cardinal	Cedar Creek	Cedar Creek Experience	
	C – Black Label	C – Wolf Pack	Evo Southwest	Flagstaff Classic	Impression
	Riverstone	Rockwood Signature		Rogue Armored	Sabre
	Salem Hemisphere		Sandpiper	Sandstorm	Shockwave
	Sierra	Stealth	Wildcat	Wildwood Heritage Glen	
	XLR Nitro				
Destination Trailers	Cedar Creek Cottage		Aurora	Cherokee - Timberwolf	
	IBEX	No Boundaries	Salem Villa	Sandpiper Destination	
	Sierra Destination		Wildwood Lodge		
Travel Trailers	Aurora	Campsite Reserve, and Ultra		C - Alpha Wolf	C - Black Label
	C - Grey Wolf	C - Wolf Den	C - Wolf Pack	C - Wolf Pup	Evo
	Flagstaff Campers (3)		F - Travel	Flagstaff E-Pro	Flagstaff Micro Lite
	F - Shamrock	F - Super Lite	Grand Surveyor	Ibex	Nightfall
	No Boundaries	Ozark	R -Campers (3)	R - Geo Pro	R - Mini Lite
	R - Roo	R – Sign. Travel	R - Ultra Lite	Rogue Armored	Rogue SUT
	R-Pod	Salem	S - Cruise Lite	S - FSX	Sandstorm
	S - Hemisphere Travel Trailers		Shockwave	Stealth	V-Trec Camper
	Surveyor Legend, and Legend X		Vibe	Viking Camping Trailers	
	Viking ROK	V - Travel Trailers	Wildcat Travel Trailers		Wildwood
	W - FSX	W - Heritage Glen		W - X-Lite	Work and Play
	XLR Boost	XLR Hyperlite			
Unlisted	Aviator	Blue Ridge	Cascade	C - Patriot	Fury
	Independence Trail		Rainer	Sonoma	Trilogy
	True North Ice lodge		Vengeance	V-Cross	
Coachmen					

5th Wheel	Brookstone	Chaparral, and Chaparral Lite			
Trailers	Adrenaline	Apex Nano, and Apex Ultra-Lite		Catalina Destination Series	
	Catalina Expedition, Legacy, Summit Series 7, Summit Series 8, and Trail Blazer				
	Clipper Rok	Clipper Travel Trailers		Freedom Express Select	
	Northern Spirit, Spirit Bijou, Spirit DLX & Compact, Spirit XTR				Remote
East to West					
5th Wheel	Ahara	Blackthorn	Takoda	Tandara	
Trailers	Alta	Della Terra	Longitude	Silver Lake	
Palomino					
5th Wheels	Columbus	Puma	River Ranch		
Trailers etc.	Camping Edition by Puma		Palomini	Palomino O.V.E.	Pause
	Puma	Puma Destination, Ultra Lite, Unleashed			Real-Lite Mini
	Revolve	Solaire Ultra Lite			
Prime Time					
5th Wheel	Crusader	Sanibel	Spartan (NL)		
Trailers	Avenger	Tracer	Lacrosse		
Shasta					
5th Wheel	Phoenix				
Trailers	Shasta, I-5 Edition & Compact				

121. At this time, it is still unclear the full extent of the units impacted. There are several models that have the bottom sections foamed, and sealed. The closed units being the mere fact of having a closed and foam bottom are a violation of RVIA LV 6-1.15 Access and 3-5 Location. The following models have been found to have a closed bottom preventing a quick routine inspection: 1) Cherokee Timberwolf, 2) Freedom – Coachmen, 3) Fury, Grand Surveyor, 4) Impression, 5) Northern Spirit – Coachmen, 6) No boundaries 7) Salem Villa, 8) Sierra Destination, 9) Surveyor Legend, 10) Wildwood Lodge, 11) Work and Play

B. Noteworthy Examples

122. The RV Investigation revealed three urgent primary violations overcurrent protection (3-1), strain relief (5-3.1), and wire conduction protection (5-1). There are a number of secondary violations that were also observed in the field investigation. A list of the units inspected with the violations found are detailed in Appendix C.

123. The investigation captured a significant number of seven-way wiring applicable standards violations. The section covers some of the more noteworthy issues found with the Forest River products such as fire hazards, and insulation damage

124. A 2021 Wolf Pup had no strain relief on the wiring connected to the automatically resettable mini-breaker. The mini breaker had detached from the RV frame allowing for the battery side stud of the mini-breaker to make contact with a metal junction box resulting a short and sparks. The RV dealer was immediately notified of the present danger with that particular unit.

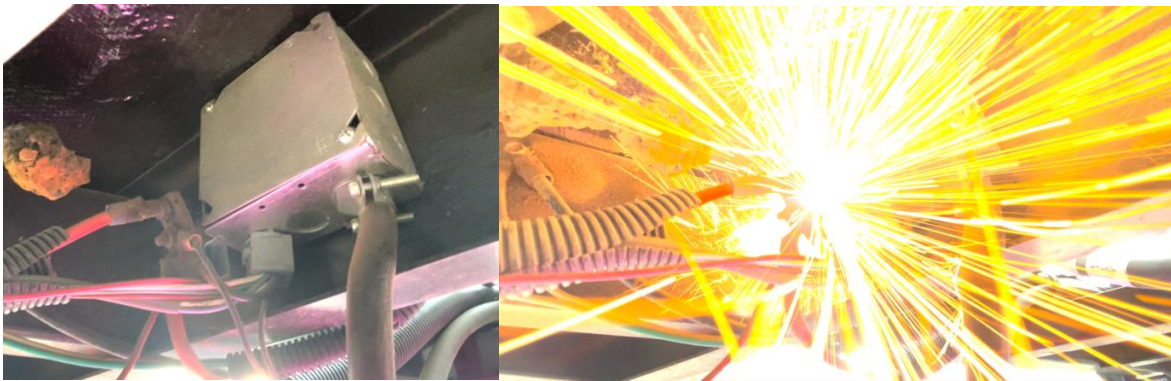


Figure 28. 2021 Wolf Pup found in dealer lot with battery installed and disconnected breaker [Exhibit]

125. The wire insulation can be damaged using the hardware and methods that Forest River is currently using. The wire insulation can be damaged due using the improper wire clamp and not strain relieving the connection correctly. The connector to the junction box first gets disconnected from the junction box. Slowly as the cables dangle the edge of the junction box starts to wear away either slowly or catastrophically. Figure 29 shows how the insulation of the seven-way wiring can start to wear away after the wire clamp nut comes loose due to vibrations of the towable RV. The wire shows damage where insulation is beginning to be shaved off. Figure 30 shows an Arlington plastic push-in connector that got loose and sections of the bare exposed white wire. Both of these have been seen in the RV sales lots.

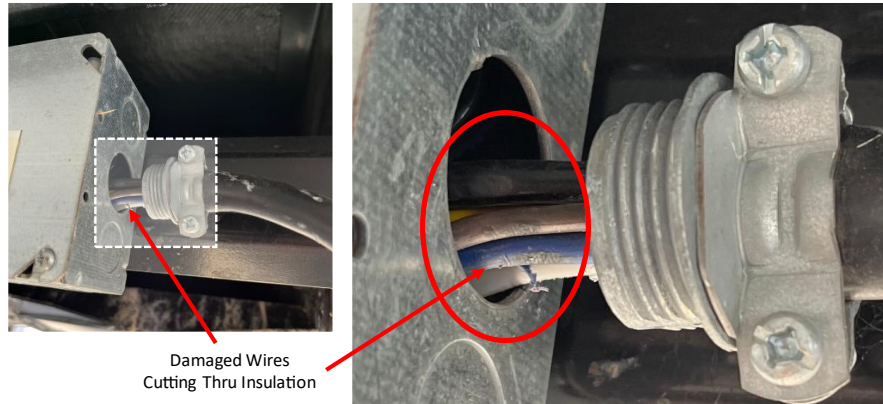


Figure 29. Damaged insulation Wiring on a 2019 Rogue Vengeance due to improper electrical clamp used (VIN 5zt3vgwbx1001654).

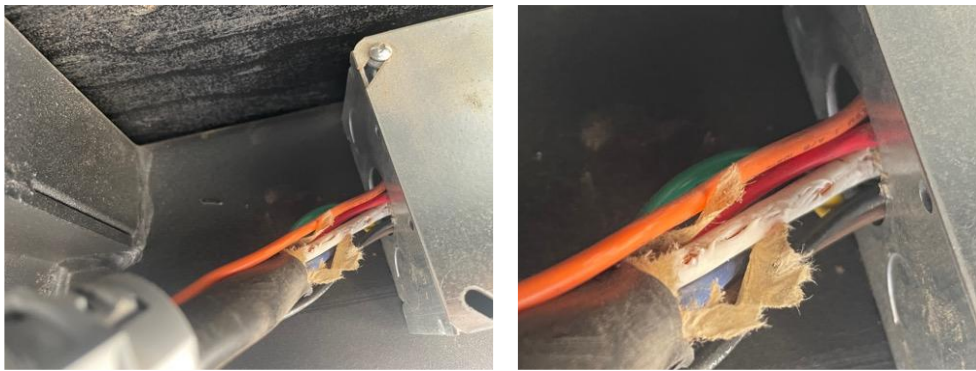
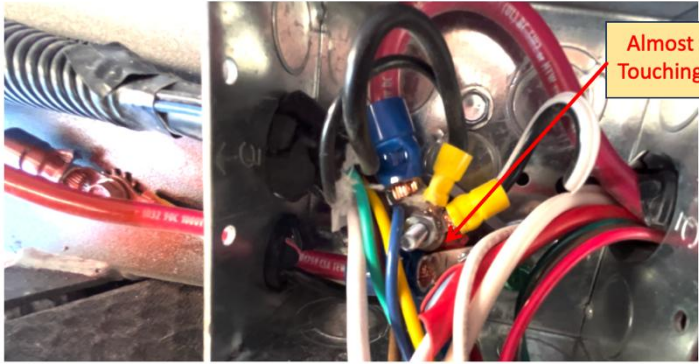
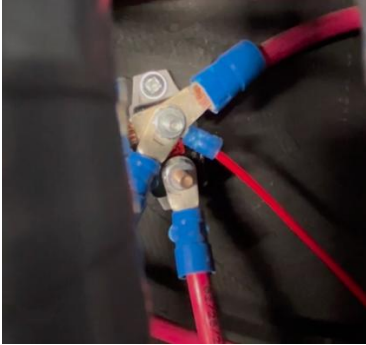


Figure 30. Damaged insulation Wiring on a 2022 Palomino Puma due to improper electrical clamp used (VIN 4x4fptp23pp098788).

126. Example Loose nut with Connectors less 1 mm apart.

127. On a Silverlake (East to West) trailer fabricated 7/19/24, there was a battery braker yet the distance between the ends is about 1 mm or less apart, with battery cables not properly strained relief meaning that movement loading on the cables will result in motion in cables inside the junction box, see video. Terminals across breaker almost touching with no strain relief is not that uncommon as shown by an Ahara (East to West) as well.

Details	Photo w/ Incorrect Wiring
<p>Model: Silverlake (East to West)</p> <p>VIN: 5nhtsv716sg001888</p> <p>Fabricated Date: 7/19/24</p>	 <p>Almost Touching</p>
<p>Model: Ahara East to West</p> <p>VIN: 5zt3ah3b8n9100287</p> <p>Fabricated Date: 5/19/22</p>	

128. Another Silverlake (East to West) Trailer fabricated 7/30/24, there was a connection (VIN: 5nhtsvy28sg001947) that are essentially touching as shown in Figure 31.

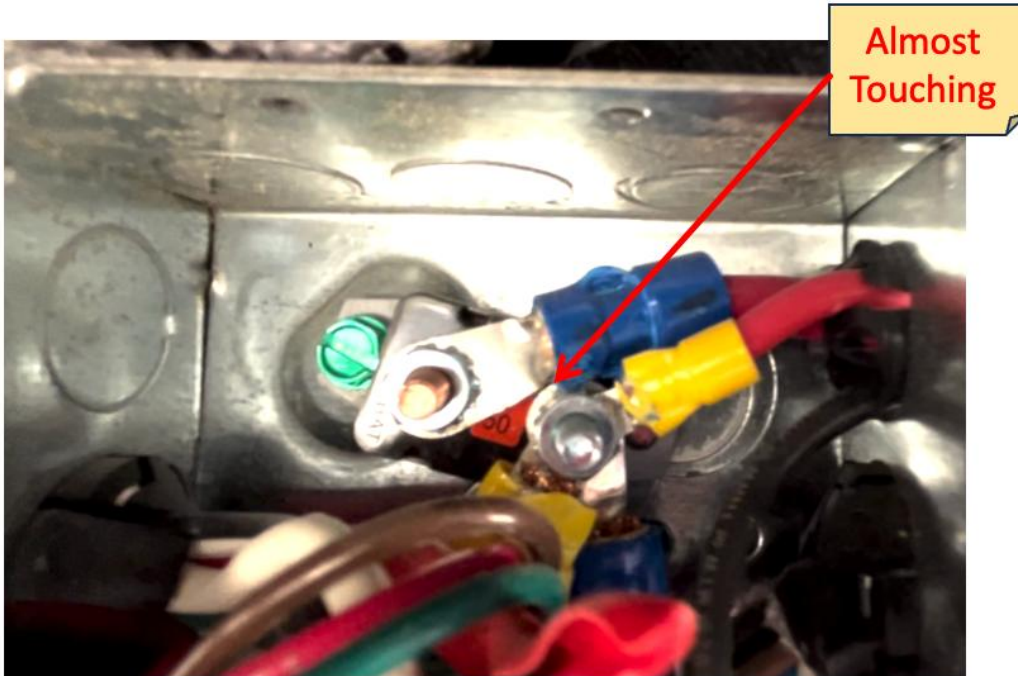


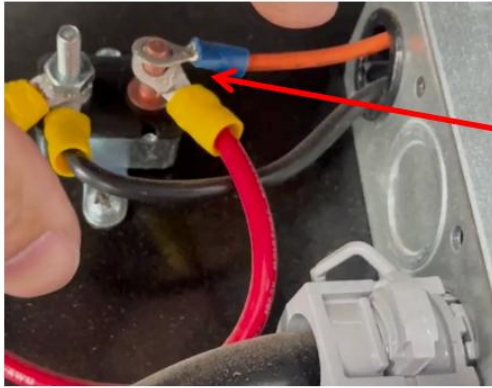
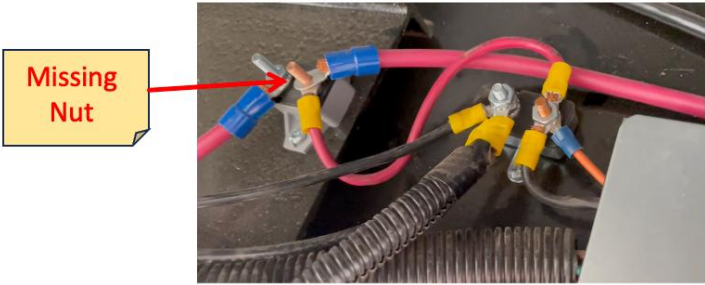
Figure 31. Silver Lake by East to West travel trailer with battery line that includes mini breaker yet the battery cable has no strain relief and the terminal ends are almost touching (VIN 5nhtsvy28sg001947)

129. The two Silverlake units above were fabricated (29861 Old Why 33, ELKHART, INDIANA) had the battery “protected.”

130. However, we found 8 Silver Lakes (East to West Division) that had the seven-way wiring defect, those were fabricated at plant location: 3000 CR 6 Elkhart, IN 46514. This goes to show the inconsistency of assembly locations and the lack of quality control across all of their plants.

131. There are some examples of travel trailers that have over current protection on the charge, yet they fail to put nuts on the mini breaker to secure the terminals. The on the 2024 Sandstorm the breakaway line is orange; therefore, in the event that terminal comes off and the

breakaway switch is triggered, the trailer will not break because there may not be power due to this loose end. On another travel trailer, Salem Cruise Lite, the missing nut on the mini-breaker is on the battery lead. If that 6-gauge battery lead does come off and makes contact with the chassis with is ground, then the consequences is burning a 6 gauge wire right under the flooring material of the travel trailer.

Details	Photo w/ Incorrect Wiring
Model: Sandstorm VIN: 4x4tsca2xrc012493 Fabricated Date: 1/31/2024	
Model: Salem Cruise Lite VIN: 4x4tsmb25pc015934 Fabricated Date: 3/30/2023	

C. List of Units Produced after June 4, 2024, with seven-way wiring defects

132. The following 47 units were fabricated after June 4, 2024, and have a seven-way wiring defect. The following 11 Forest River models were fabricated after June 4, 2024, and have the same seven-way wiring defect that generated the Cedar Creek and Puma Recall:

Campsite Reserve, Coachman Clipper, Ahara, Della Terra, Silver Lake, Flagstaff, Ozark, Salem, Shockwave, Viking, and Wildwood.

Field Investigation data showing units built after June 4, 2024 with the same wiring defect

#	Model	Type	Date	VIN #	City
1	Aurora	Travel Trailer	9/24/2024	5ZT2ARKBXSU044669	MIDDLEBURY, INDIANA
2	Campsite Reserve	Travel Trailer	8/21/2024	5ZT2CRPB4SF079277	MIDDLEBURY, INDIANA
3	Campsite Reserve	Travel Trailer	8/28/2024	5ZT2CRPB4SF079361	MIDDLEBURY, INDIANA
4	Campsite Reserve	Travel Trailer	8/19/2024	5ZT2CRRB3SF079249	MIDDLEBURY, INDIANA
5	Campsite Reserve	Travel Trailer	9/3/2024	5ZT2CRRB1SZ080642	BUTLER, INDIANA
6	Campsite Reserve	Travel Trailer	6/18/2024	5ZT2CRMB8SF078721	MIDDLEBURY, INDIANA
7	Campsite Reserve	Travel Trailer	7/31/2024	5ZT2CRMB9SF079103	MIDDLEBURY, INDIANA
8	Campsite Reserve	Travel Trailer	7/31/2024	5ZT2CRMB7SF079102	MIDDLEBURY, INDIANA
9	Campsite Reserve	Travel Trailer	7/30/2024	5ZT2CRMB0SF079085	MIDDLEBURY, INDIANA
10	Campsite Reserve	Travel Trailer	7/31/2024	5ZT2CRMB0SF079099	MIDDLEBURY, INDIANA
11	Campsite Reserve	Travel Trailer	6/13/2024	5ZT2CRRB7SF078685	MIDDLEBURY, INDIANA
12	Campsite Reserve	Travel Trailer	11/7/2024	5ZT2CRPB5SF079997	MIDDLEBURY, INDIANA
13	Cherokee Black Label	Travel Trailer	7/26/2024	4X4TCKU22SK091351	TOPEKA, INDIANA
14	Cherokee Grey Wolf	Travel Trailer	10/1/2024	4X4TCKY21SK092422	TOPEKA, INDIANA
15	Cherokee Wolf Pup	Travel Trailer	8/8/2024	5ZT2CKCC6SY035002	TOPEKA, INDIANA
16	Clipper - Coachmen	Travel Trailer	6/24/2024	5ZT2CWFC4SJ134848 *	WHITE PIGEON, MICHIGAN
17	Clipper - Coachmen	Travel Trailer	7/31/2024	5ZT2CWAC2SJ135097 **	WHITE PIGEON, MICHIGAN
18	Clipper - Coachmen	Travel Trailer	7/31/2024	5ZT2CWAC0SJ135096 **	WHITE PIGEON, MICHIGAN
19	Flagstaff	Travel Trailer	6/12/2024	4X4CFS21XSD320770	MILLERSBURG, INDIANA
20	Longitude - East to West	Travel Trailer	8/21/2024	5ZT2LNRB6S9010966	ELKHART, INDIANA
21	Ozark	Travel Trailer	7/19/2024	5ZT2ZKSB6SG405393	WAKARUSA, INDIANA
22	Ozark	Travel Trailer	7/17/2024	5ZT2ZKRB8SG405367	WAKARUSA, INDIANA
23	Ozark	Travel Trailer	7/25/2024	5ZT2ZKFCXSG405447	WAKARUSA, INDIANA
24	Ozark	Travel Trailer	7/25/2024	5ZT2ZKFC4SG405458	WAKARUSA, INDIANA
25	Ozark	Travel Trailer	7/24/2024	5ZT2ZKFC1SG405434	WAKARUSA, INDIANA
26	Ozark	Travel Trailer	7/23/2024	5ZT2ZKFC9SG405424	WAKARUSA, INDIANA
27	Ozark	Travel Trailer	7/30/2024	5ZT2ZKEC7SG405522	WAKARUSA, INDIANA
28	Ozark	Travel Trailer	7/26/2024	5ZT2ZKEC2SG405492	WAKARUSA, INDIANA
29	Salem FSX	Travel Trailer	9/5/2024	5ZT2SMGC7SG075314	WAKARUSA, INDIANA
30	Salem FSX	Travel Trailer	6/5/2024	5ZT2MSB6RG075006	LAGRANGE, INDIANA
31	Shockwave	Travel Trailer	8/30/24	4X4TSHA27RE007236	HEMET, CALIFORNIA
32	Silver Lake - East to West	Travel Trailer	6/11/24	5ZT2SKSB8S9014643	ELKHART, INDIANA
33	Silver Lake - East to West	Travel Trailer	8/14/24	5ZT2SKGB7S9014903	ELKHART, INDIANA
34	Silver Lake - East to West	Travel Trailer	8/12/24	5ZT2SKRB3S9014894	ELKHART, INDIANA
35	Silver Lake - East to West	Travel Trailer	7/24/24	5ZT2SKPB4S9014809	ELKHART, INDIANA
36	Viking	Travel Trailer	7/11/2024	5ZT2VWNB4SJ134948	WHITE PIGEON, MICHIGAN
37	Wildwood	Travel Trailer	8/30/2024	4X4TWDX27ST145817	DALLAS, OREGON
38	Wildwood FSX Series	Travel Trailer	8/27/2024	5ZT2WDGC4SG204677	WAKARUSA, INDIANA
39	Wildwood X-Lite Series	Travel Trailer	8/6/2024	4X4TWDZ29S7379253	MIDDLEBURY, INDIANA
40	Wildwood X-Lite Series	Travel Trailer	6/17/2024	4X4TWDZ21S7378999	MIDDLEBURY, INDIANA
41	Wildwood X-Lite Series	Travel Trailer	6/19/2024	4X4TWDD27ST145773	DALLAS, OREGON
42	Wildwood X-Lite Series	Travel Trailer	9/30/2024	4X4TWDD21ST145820	DALLAS, OREGON
43	Wildwood X-Lite Series	Travel Trailer	8/25/24	4X4TWDX27ST145784	DALLAS, OREGON
44	Wildwood X-Lite Series	Travel Trailer	8/7/24	4X4TWDD24ST145813	DALLAS, OREGON
45	Wildwood X-Lite Series	Travel Trailer	7/15/24	4X4TWDC2XST145767	DALLAS, OREGON
46	Wildwood X-Lite Series	Travel Trailer	7/13/24	4X4TWDX23ST145782	DALLAS, OREGON
47	Wildwood X-Lite Series	Travel Trailer	7/13/24	4X4TWDX25ST145783	DALLAS, OREGON

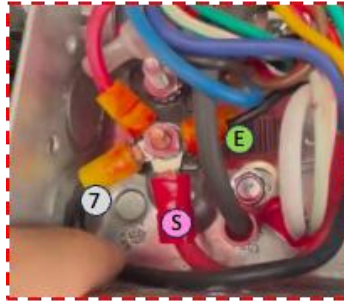

D. Violation: Overcurrent Protection 3-1

133. The ongoing investigation has revealed that there are at about 220 of units out of the over 400 inspected that have the electrical wiring error. That includes 47 units that have the error after the June 4, 2024 recall for the Cedar Creek and Puma.

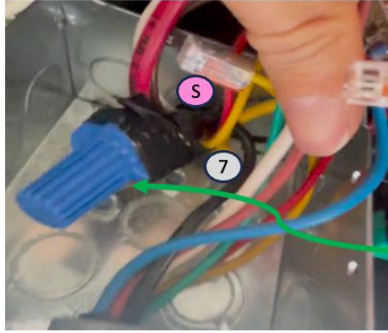
134. Some noteworthy violations of overcurrent protection examples are shown in Table 9. As shown by comparing the Campsite Reserve and the Viking model, plants in different states continue to fabricate with the wrong electrical wiring.


Table 9. Example Forest River Overcurrent Protection 3-1 Violations

Details	Photo w/ Incorrect Wiring
<p>Model: Campsite Reserve</p> <p>VIN: 5zt2crrb7sf078685</p> <p>Fabricated Date: 6/13/24</p> <p>Plant: Middlebury, Indiana</p>	<div data-bbox="678 892 1023 1228"> <p>Wrong!</p>  </div> <div data-bbox="1084 835 1404 989">  </div> <div data-bbox="1092 1056 1385 1207"> <ul style="list-style-type: none"> E Break Away Line S RV Battery 7 7-Way Charge Line </div>

<p>Model: Viking</p> <p>VIN: 5zt2vwnb4sj134948</p> <p>Fabricated Date: 7/11/24</p> <p>Plant: White Pigeon, Michigan</p>	<p>Wrong!</p>   <p> E Break Away Line S RV Battery 7 7-Way Charge Line </p>
--	--

135. In one Wildwood XLite, a wing wire connector was used to connect the seven-way wiring charge line to an unprotected RV battery line. A Wildwood FSX Platinum Fabricated 8/27/24 was inspected on 9/20/24 and has the wrong electrical wiring.

Details	Photo w/ Incorrect Wiring
<p>Model: Wildwood XLite</p> <p>VIN: 4x4twdz29s7379253</p> <p>Fabricated Date: 8/6/2024</p> <p>Plant: Middlebury, Indiana</p>	<p>Wildwood Xlite (9253)</p>  <p> E Break Away Line S RV Battery 7 7-Way Charge Line </p> <p>No Breaker Wirenut connects Battery to 7-Way Charge Line</p>

Model: Wildwood FSX Platinum VIN: 5zt2wdgc4sg204677 Fabricated Date: 8/27/2024 Plant: Wakarusa, Indiana	Wildwood FSX Platinum (4677)  <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="display: flex; flex-direction: column; align-items: center; margin-right: 10px;"> <div style="background-color: #90EE90; border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-bottom: 5px;">E</div> <div style="background-color: #FFB6C1; border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-bottom: 5px;">S</div> <div style="background-color: #D3D3D3; border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;">7</div> </div> <div> <p>Break Away Line</p> <p>RV Battery</p> <p>7-Way Charge Line</p> </div> </div>
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E. Violation: Strain Relief 5-3.1

136. Strain relief is something that most people are familiar with every day and may not be aware of the name. The purpose of strain relief is to prevent forces (yanks, snags, and pulls) from being transmitted into the electrical connections.

137. Thus, when RVIA LV section 5-3.1 requires strain relief on “conductors connecting components that can move with relation to each other” that is to prevent yanks, snags, and pulls from affecting contacts of the wires (ForestRiver0000047).

138. The function of strain relief on mechanical elements is one of the fundamental parts of machine design, see Excerpt from Fundamentals of Design below.

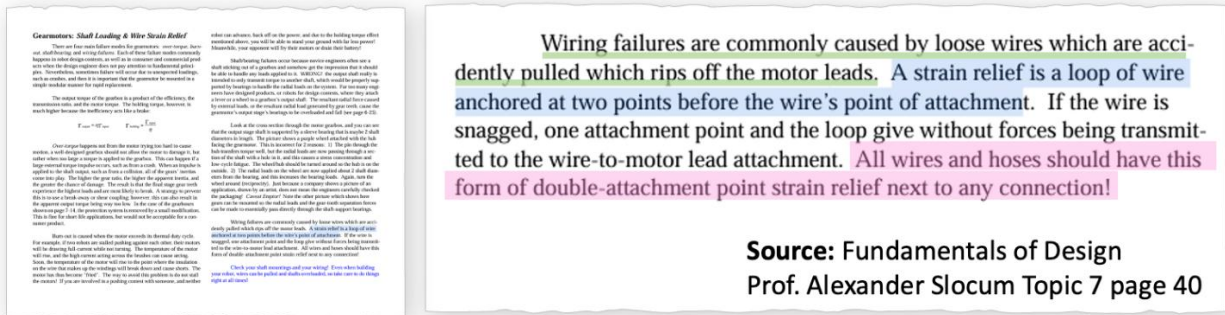


Figure 32. Free Fundamentals Design Guide by Massachusetts Institute of Technology Faculty Prof. Alex Slocum

139. The distance between the double-attachment point is also important. If a wire diameter is 1 inch for example, The two attachments points should be between 3 to 5 inches in order for the strain relief to be effective.

140. A simple online search online search of “Strain relief definition” shows that the information is readily available [Stecker Express](https://steckerexpress.com/) is the first link that comes up.

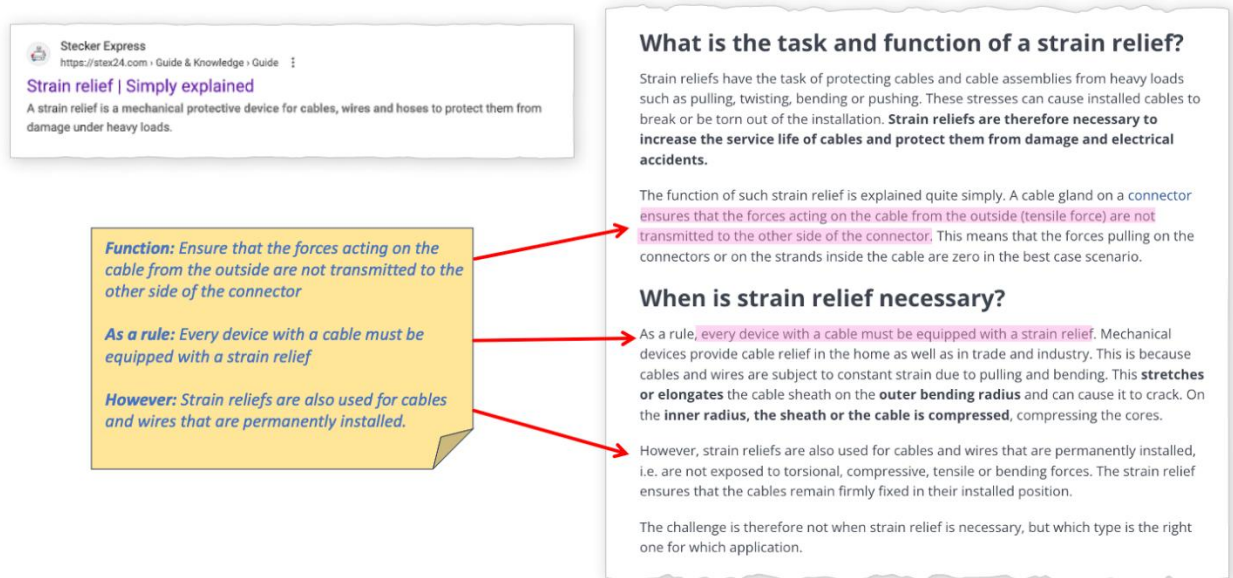



Figure 33. Strain relief explained from website Stecker Express first link on google

141. When a means to strain relief on cables is not implemented or done correctly then the wire connectors will get come off leaving the wire connections to be yanked and pulled in such a way as to disconnect and cause shorts if the wires are running power.

142. Improper strain relief on seven-way wiring going into the junction box using non-metallic clamp connectors, designed for residential construction applications. A combination of improper installation of the connector and no strain relief leaves the nut on the back of the connector to come loose and come off.

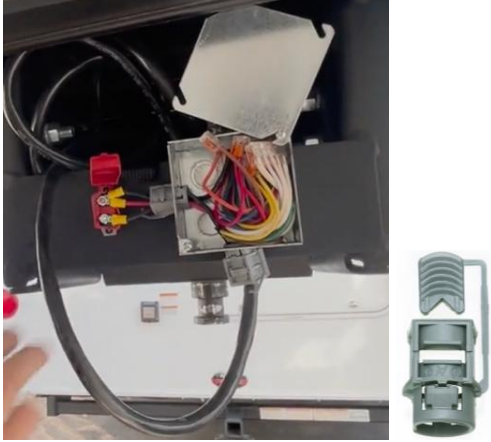


Table 10. Example Forest River Overcurrent Protection 3-1 Violations

Details	Photos
Model: Vengeance Rogue VIN: 5zt3vgxb0k1000803 Fabricated Date: 4/30/2018	 
Model: Black Thorn VIN: 5zt3bt3b2r9012602 Fabricated Date: 11/09/23	 

143. Improper strain relief on seven-way wiring going into the junction box using non-metallic plastic push in connectors, designed for residential construction applications. A


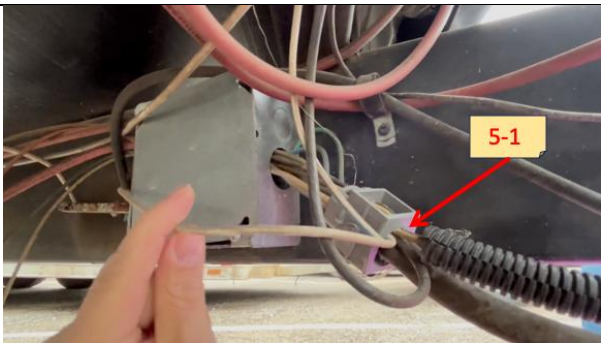
combination of improper installation of the push-in connector, bending moments, and no strain relief leaves the nut on the back of the connector to come loose and come off.

144. See videos that show how the Arlington push-in (also referred to as snap in) connector will come off with a simple twist motion. The videos show how motions on the 2019 Puma will transfer to the interior of the junction box.

Details	Photos
<p>Model: Columbus</p> <p>VIN: 4x4fcmp27s6014763</p> <p>Fabricated Date: 8/21/2024</p>	
<p>Model: Chaparral - Coachman</p> <p>VIN: 5zt3clvb8ra331527</p> <p>Fabricated Date: 4/8/2024</p>	
<p>Model: Rockwood Mini-Lite</p> <p>VIN: 4x4trla23nd451132</p> <p>Fabricated Date: 6/15/2022</p>	

F. Violation: Wire Conductor Protection 5-1

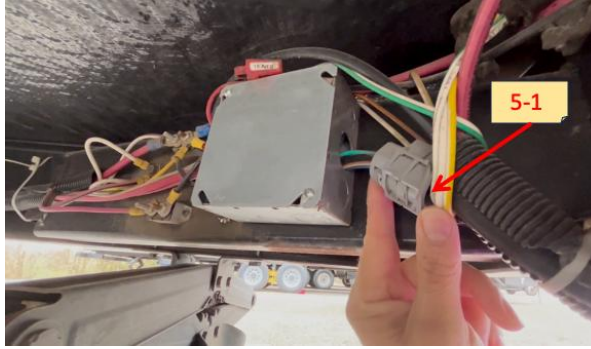
145. As the wire travel through bends with sharp edges it should be protected against physical damage by using an additional wrap or layer of equivalent material, referred to as a loom in the RV industry. Below are examples where the wires are passed through sharp edges or are exposed through sharp edges with no additional protection. Over the usage of the vehicle these spots are the shorts can take place.

Details	Photos
<p>Model: Puma</p> <p>VIN: 4x4FPUF28KP079346</p> <p>Fabricated Date: 1/24/2019</p>	
<p>Model: Wildwood Heritage</p> <p>VIN: 4x4twbh2xku018069</p> <p>Fabricated Date: 1/8/2019</p>	

Model: Wildwood FSX

VIN: 5zt2wdgc2ng202544

Fabricated Date: 9/28/2021



G. Additional Violations Noted

146. On some RV units there are circuit breakers installed near the junction box and about 10 feet away from the battery of the RV. RVIA LV section 3-5 requires that the circuit breaker be within 18 inches of the source.

147. Three Columbus 5th wheel that were fabricated between August 21 and 27 of 2024, and they were inspected on September 14, 2024 (less than a month from manufacturing) have a breaker on the gooseneck right next to the junction box. Figure 34 shows how Forest River is putting a circuit breaker on the outside of the junction box, leaving somewhere between 8 ft and 10 ft of unprotected seven-way wiring which is a clear violation of applicable standards.

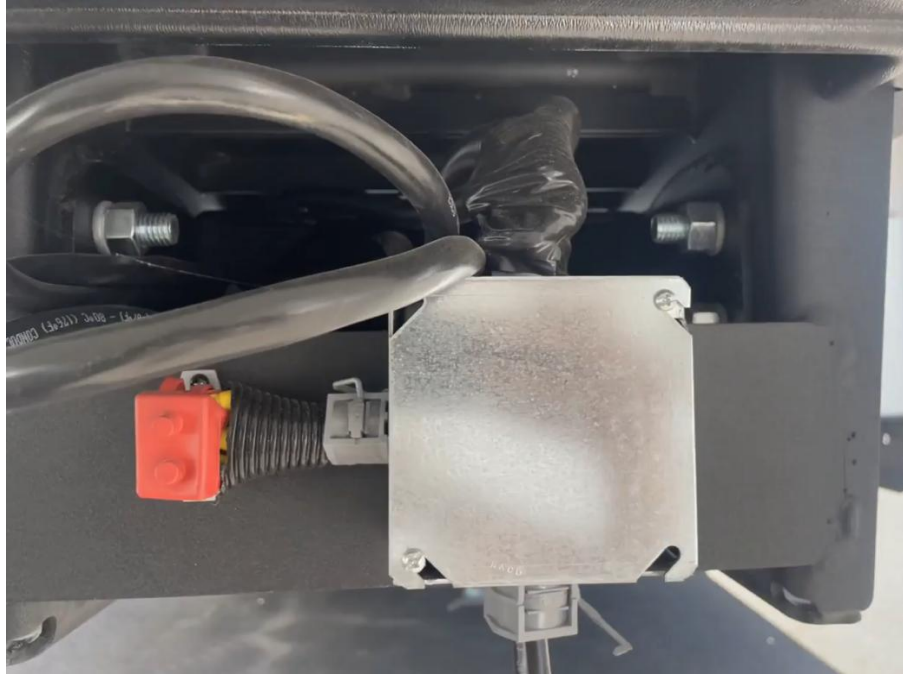


Figure 34. Sample shown of Columbus manufactured on 8/21/2024 (VIN: 4x4fcmp25s6014762)

148. The following are the Vin details for some of the other Columbuses with recent fabrication dates with the same problem:

- Columbus – Manufactured Date: 8/21/2024 - 4x4fcmp27s6014763
- Columbus – Manufactured Date: 8/27/2024 - 4x4fcmr2xs6014771
- Columbus – Manufactured Date: 7/23/2024 - 4x4fcmp20s6014720

H. Towable RV with seven-way wiring defects

149. The following is the list of models with VIN numbers that were found in the Field Investigation to have seven-way wiring defects.

Model	Type	Units	VINs (Model Year)	
Aurora	Travel Trailer	2	5ZT2ARKBSU044669	5zt2arlb7ru043522
Avenger - PrimeTime	Travel Trailer	12	5zt2aveclrg815204	5zt2avlb1ng814302
			5zt2avec8ng812553	5ZT2AVLB4NG813189
			5zt2avfc2rg814755	5ZT2AVLBXNG814301
			5ZT2AVFC4RG814756	5zt2avpb4sg815367
			5ZT2AVFC8RG814727	5zt2avpb5sg815359
Campsite Reserve	Travel Trailer	14	5zt2avjb1jb916208	5zt2avsb1gb911128
			4X4TC1B27RX163512	5zt2crpb4sf079277
			5ZT2CRMB0SF079085	5zt2crpb4sf079361
			5zt2crmb0sf079099	5ZT2CRPB5SF079997
			5zt2crmb7sf079102	5ZT2CRPB9RF078541
			5zt2crmb8rf077465	5zt2crrb1sz080642
			5zt2crmb8sf078721	5zt2crrb3sf079249
			5ZT2CRMB9SF079103	5zt2crrb7sf078685
Catalina	Travel Trailer	1	5ZT2CARB6RU043966	
Cedar Creek	5th Wheel	5	4X4FCRM25HS216518	4x4fcrp28ks222882
			4x4fcrp20ns230527	4x4fcrp34ps232323
			4X4FCRP22MS227966	
Cedar Creek Cottage	Destination	2	4x4tcrs20ms227040	
			4X4TCRS24RS233561	
Cherokee - Alpha Wolf		1	5zt2cky4r2012573	
Cherokee - Black Label		4	4X4TCU22SK091351	5zt2ckfc9py029035
			5zt2ckfc7ny023957	5zt2ckgc9ry033281
Cherokee - Grey Wolf		8	4x4tcke25rk089781	4x4tckx20mk066415
			4x4tcke28rk090245	4x4tckx20mk071810
			4x4tcku22cy203774	4x4tckx20pk085291
			4x4tcku28rk089839	4X4TCY21SK092422
Cherokee - Patriot		4	5zt2ckec3my015600	5zt2ckfcxmy012448
			5zt2ckec9my008120	5zt2ckgcxmy009273
Cherokee - Wolf Den		3	5zt2ckec6ry031121	5zt2ckec8ry033565
			5zt2ckec8ny022740	
Cherokee - Wolf Pack		1	5zt3ct2b6m1217023	
Cherokee - Wolf Pup		14	4x4tck613jk048902	5zt2ckec8ny022740
			5ZT2CKCC6SY035002	5zt2ckec8ry033565
			5zt2ckec0my014825	5ZT2CKFC2NY019380
			5zt2ckec2my009402	5ZT2CKFC9RY030088
			5zt2ckec4ny019737	5zt2ckgc5my017183
			5zt2ckec6ry031121	5zt2ckgcxly004220
			5zt2ckec8ny018865	
Clipper - Coachmen		4	5zt2cwac0sj135096	5zt2cwfc4sj134848
			5zt2cwac2sj135097	5zt2cwfb0pj133550
Columbus - Palomino		1	4x4fcmn21m6012075	
Crusader - PrimeTime		1	5zt3csyb6ng127189	
Della Terra - East to West		2	5zt2devb9r9013891	5zt2dext8r9013975
Evo		3	4x4tsja20lc020789	4x4tsju24fc013988
			4x4tsjb23pc024338	
Flagstaff		2	4x4cfs213ed170960	4x4cfs21xsd320770
Flagstaff Classic Travel		6	4x4cfs212pd189616	4x4cfs412pd188852
			4x4cfs213fd174704	4x4cfs615gd175784
			4x4cfs215gd176133	4x4cfs10ed172420
Flagstaff Hard Side		2	4x4cfs219pd189614	4x4cfs41xpd188842
Lacrosse		1	5zt2lc0b2rg000118	
Longitude - East to West		1	5zt2lnrb6s9010966	
Nightfall		2	5zt2nfpb4rz002393	5zt2nfbk4rz002367
Ozark	Travel Trailer	8	5zt2zkec2sg405492	5zt2zkfc9sg405424
			5zt2zkec7sg405522	5zt2zkfcxsg405447
			5zt2zkfc1sg405434	5zt2zkfb8sg405367
			5zt2zkfc4sg405458	5zt2zkfb6sg405393
Palomino		2	4x4tpat17gn047195	4x4cpc014hn049083
Puma - Palomino	5th Wheels	5	4x4fpua2xnp092692	4X4FPUF22LP084415
			4x4fpub25mp091107	4X4FPUF28KP079346
			4x4fpue28np093947	

R-Pod		2	4x4trpt10f2007893	4x4trpt12j2014367
Rainer		1	4X4TRN22XLT151915	
Rockwood Freedom		7	4x4cfm014ad278092	4x4cfmw2xkd305765
			4x4cfm417pd319155	4x4cpr215jd302312
			4X4CFMW28HD298985	4x4crkx16ed290073
			4x4cfmw29hd298767	
Rockwood Premier		5	4x4cpur1xed290421	4x4cpur17fd293701
			4x4cpr216fd292820	4x4cpr215jd302312
			4x4cpr710fd292997	4x4cpr617kd305868
Salem Cruise Lite Series		7	4x4tsmx2xdr401461	4x4tsmc24pe026281
			4x4tsmv29ht110879	4x4tsmb25pc015934
			4x4tsmc26me024995	4x4tsmz24r7433497
			4x4tsmd29n7429267	
Salem FSX		5	5zt2smgc5ng073324	5zt2smsb6rg075006
			5zt2smfc7pn801466	5zt2smgc7sg075314
			5zt2smgc2rn802042	
Shasta		2	5zt2sspb3pe020874	5zt2ssrb8ke013439
Shockwave		7	4x4tsfh28me006260	4x4tshb25re007251
			4x4tshe26nc006840	4x4tsha27re007236
			4x4tshe29pe007102	4X4TSHZ28PC007176
			4x4tshc24re007241	
Silver Lake - East to West		8	5zt2skrbxm9004611	5zt2sksb8s9014643
			5zt2sksb5p9012307	5zt2skpb4s9014809
			5zt2skyb7r9014067	5zt2skrb3s9014894
			5zt2skjb3r9014075	5zt2skgb7s9014903
Stealth		12	4x4tsfc26mc022199	4x4tsfc23pc024528
			4x4tsfz24nc023652	4x4tsfa22re024787
			4x4tsfc24nc023773	4x4tsfc28re024807
			4x4tsfz26nc023653	4x4tsfa21re024778
			4x4tsfz27nc023659	4X4TSFY219C008033
			4x4fsfk29pc024550	4X4TSFC21NE023489
Tracer		1	5zt2trpb5pb523703	
V-Trec		1	5zt1vtjc0n5019916	
Vengeance		5	5zt2vgpb0k1000845	5ZT2VGTBXJ1000016
			5zt2vgxb5k1001067	5NHTVGA2XPC004747
			5zt3vgwb4l1001908	
Vibe		1	4x4tvbz28mt152525	
Viking		10	5zt1vkacx15017596	5zt2vwgc7rj134667
			5zt1vkac6m5018407	5zt2vwrb2rj134676
			5zt2vwrb5rj134252	5zt2vwrb9rj134738
			5zt2vwrb0rj134353	5zt2vwsb4rj134723
			5zt2vwsb8rj134501	5zt2vwnb4sj134948
Viking Camping Trailer		4	5zt1vknc0j5014441	5zt1vkecxm5019182
			5zt2vwfc2lj123925	5zt2vwfc7rj134685
WildCat	5th Wheel	1	4x4fwce27pg004546	
Wildcat Travel Trailer	Travel Trailer	3	4x4fwce27pg004546	4x4twcc26mt018723
			4x4twcd28lt018509	
Wildwood		3	4X4TWD24HT140198	4X4TWDX27ST145817
			4x4twdt13pe036442	
Wildwood FSX Series		6	5zt2wdgc2ng202544	4X4TWD215RT145726
			4x4twd715ry101593	4X4TWD212RT145781
			4x4twdf28ry102036	5zt2wdgc4sg204677
Wildwood X-Lite Series		10	4X4TWD223RT145708	4x4twdc2xst145767
			4x4twdz21s7378999	4x4twdz29s7379253
			4X4TWD227ST145773	4X4TWD224ST145813
			4X4TWD23ST145782	4x4twdx27st145784
			4X4TWD25ST145783	4X4TWD221ST145820
XLR Boost	Travel Trailer	3	5zt2xlsb9mz000020	5zt2XluB3NZ001064
			5zt2xlbjbxjz790070	
XLR Microboost	Travel Trailer	2	5zt2xlsb5rz002094	5ZT2XLNB6RZ002049

X. NELSON’S CASE

150. The following section is the research performed to get to the facts associated with the 2019 Puma fire that has resulted in uncovering a significant defect in Forests River’s low voltage wiring and failures in quality control processes.

151. This section addresses the following topics: fire incident, reconstruction evidence, Forest River erroneous assertions, established pattern of defects, and wiring experiments that demonstrate importance of having over-current protection on the seven-way wiring.

A. Individuals of Interest

152. The following section outlines the individuals of interest based on Nelson’s and Ms. Nelson’s depositions. In order to identify the facts of this case, I have also considered the opinions/testimony of the 14 individuals taken thus far found in Figure 35.

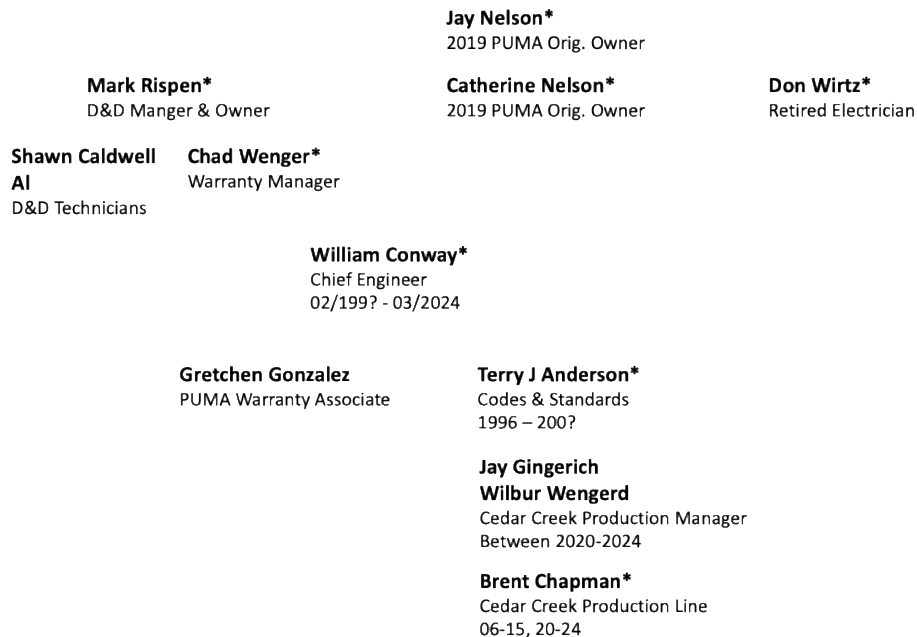


Figure 35. Relationship chart of individuals. Note that an asterisk “*” denotes that I have reviewed deposition testimony

B. Fire Incident

153. The fire incident outlined is based on the deposition statements of Jay Nelson and Catherine Nelson.

154. The sequence of events consists of Nelson, with a 26-year law enforcement career, starting to drive with his 2019 Puma in tow on the early afternoon of May 29th, 2020.

155. The site location is Black Sandy Campground (approximate address: 6563 Hauser Dam Rd, Helena, MT 59602), as shown in Figure 36.

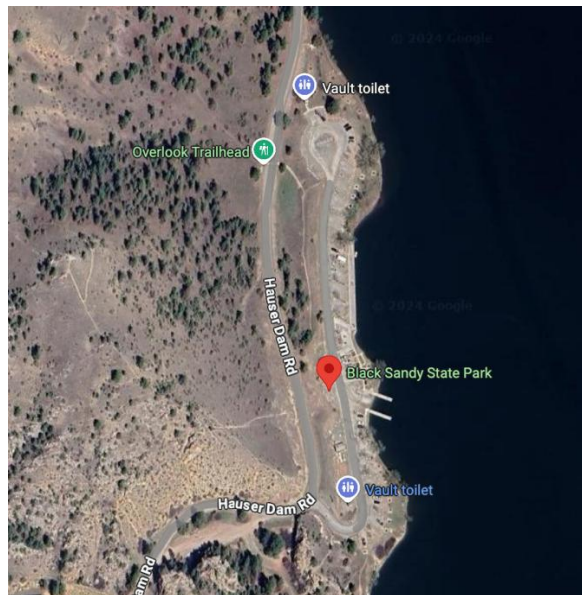


Figure 36. Black Sandy Campground

156. As Jay Nelson drove past the camp host, his family waved. Inside Nelson's vehicle is his wife, Catherine Nelson, and their three children (youngest Ireland was just 3 years old is in a car seat at the time of the incident). Nelson looks in the rear mirror and notices an "excessive amount of dust."

157. Nelson continued to drive a short distance to the stop sign, and jumped out of the tow vehicle to inspect the trailer because it appeared to be more than dust. Upon getting close he then "knew" it was not dust "it was a fire" based on the amount of smoke coming from the RV trailer. By this time Ms. Nelson had gotten out of the vehicle as well.

158. At the stop sign the towable RV was at an incline and could not be left there for safety reasons. Nelson “immediately reacted” rushed back into his truck, to quickly find a safe location to disconnect (emergency unloading site) from the 2019 Puma that has caught fire and front area is engulfed in smoke from the burning wire insulation. Catherine did not have time to get back inside the pick-up truck, she was left at the stop sign.

159. The priority for Nelson were simple: 1) put vehicle and towable in a flat area to disconnect 2) get family out of harms way, and 3) disconnect 2019 Puma vehicle from the tow vehicle.

160. Nelson stated in his deposition that he had seen in his 26 years as a law officer, how “RV will catch on fire and burn to the ground in a matter of minutes.”

161. Nelson quickly “pulled to left to a parking area outside of the stop sign,” quickly started to get the kids out of the RAM pick-up truck. By this time, Catherine Nelson reached the emergency unloading site. With the three children ages approximately 13, 9, and 3 out of harm’s way, both Nelson and Ms. Nelson started the process to disconnect the tow vehicle from the trailer.

162. They lowered the front landing gear, pulled out the pins, put chucks under the wheel. Disconnected components and with the trailer fully disconnected and his family out of harm’s way, Nelson moved his RAM pick-up truck forward to prevent fire damage.

163. Afterwards, Nelson went thru the vehicle to ensure that there were “no active flames.” The propane tanks were removed from the 2019 Puma just in case.

164. The 2019 Puma was left at the campsite and was towed to the dealer where he purchased RV, D&D RV Center in (Helena Montana).

165. By June 2020, the 2019 Puma was out of Warranty; Yet, D&D RV Warranty Manger (Chad Wenger) proceeded to contact Forest River to request approval for the fix.

166. Forest River Gretchen Gonzales Approved the 7.5 hours estimated of Labor even though the unit was out of Warranty.

167. When Rispen (D&D RV co-owner) was asked about why Forest River would agree to cover cost even though the 1-year warranty was expired, he stated that Chad who handles warranties reached out to them (Forest River) and “I don’t believe there was even any fight from them” (Rispen’s Dep. 22:16-17).

C. Incident Reconstruction

168. In the event that there is no overcurrent protection on a circuit the wire itself going to the battery heat up to a temperature of 1984° Fahrenheit (over 1085° Celsius).

169. At the point that Nelson see’s what he considers a “dusty” day when passing the camp host, the wire short has already been established. The smoke is a byproduct of the burning insulation. One of the things that can happen is that as the insulation gets burned and the internal wire is left bare this allows for new locations of shorts to be established. This assessment is based on observations of conducted experiments.

170. While Nelson did not see flames (did you ever see flames), that may be due to the significant amount of smoke burned wires from a battery short generate when shorted. The evidence that there was a fire incident as defined by the Safety ACT was present in the 2019 Puma.

171. The burned wires, damage to the section of anterior end of the 2019 Puma, and the burned interior of the battery compartment show that at one point there was a fire associated with the incident.

172. Photos of the burned unit, and D&D RV Dealer assessment show that unequivocally that there was a short in the metal junction box due to unprotected seven-way wiring (ForestRiver0000021, ForestRiver0000027). The unprotected seven-way wiring of the 2019 Puma is in violation of applicable standards.

173. Chad Wenger the Warranty manager for D&D RV center states on an email to Gretchen Gonzalez (Forest River) that “It looks to me as a connector in the junction box was not crimped properly for the charge line and that cause the short and fire,” see Figure 37. (ForestRiver0000031-32).

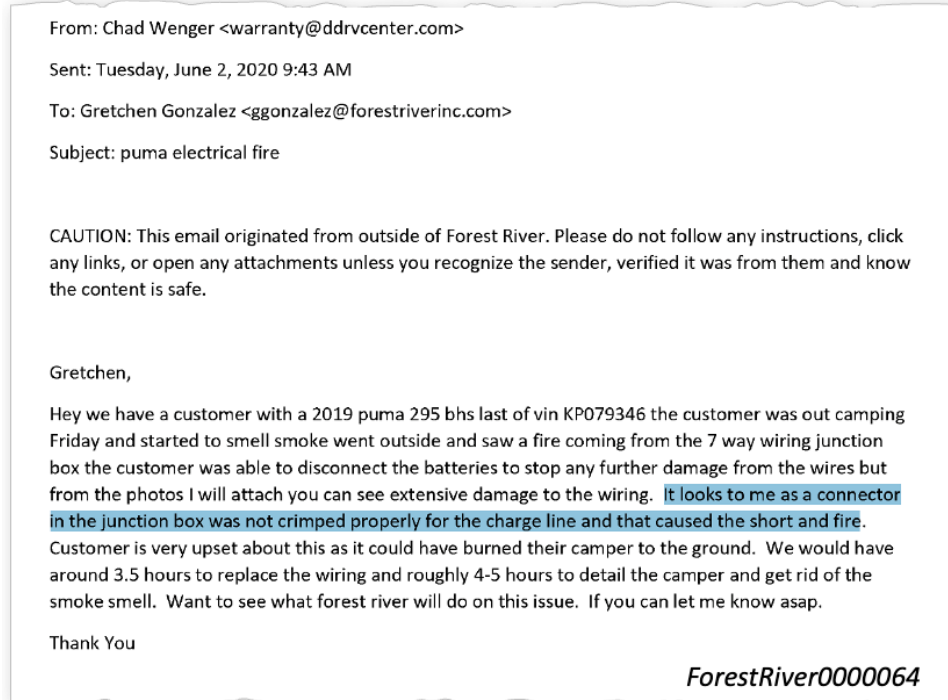


Figure 37. Email from D&D RV Dealer

174. As shown in Figure 38, the connector of the seven-way wiring came loose, leaving the exposed wires of the seven-way wiring charge line to create a short with the metal cover plate junction box designed for residential construction. Once the short was established on the unprotected seven-way wiring, the wire heated up to the point of melting its insulation and catching fire to the surrounding wires.

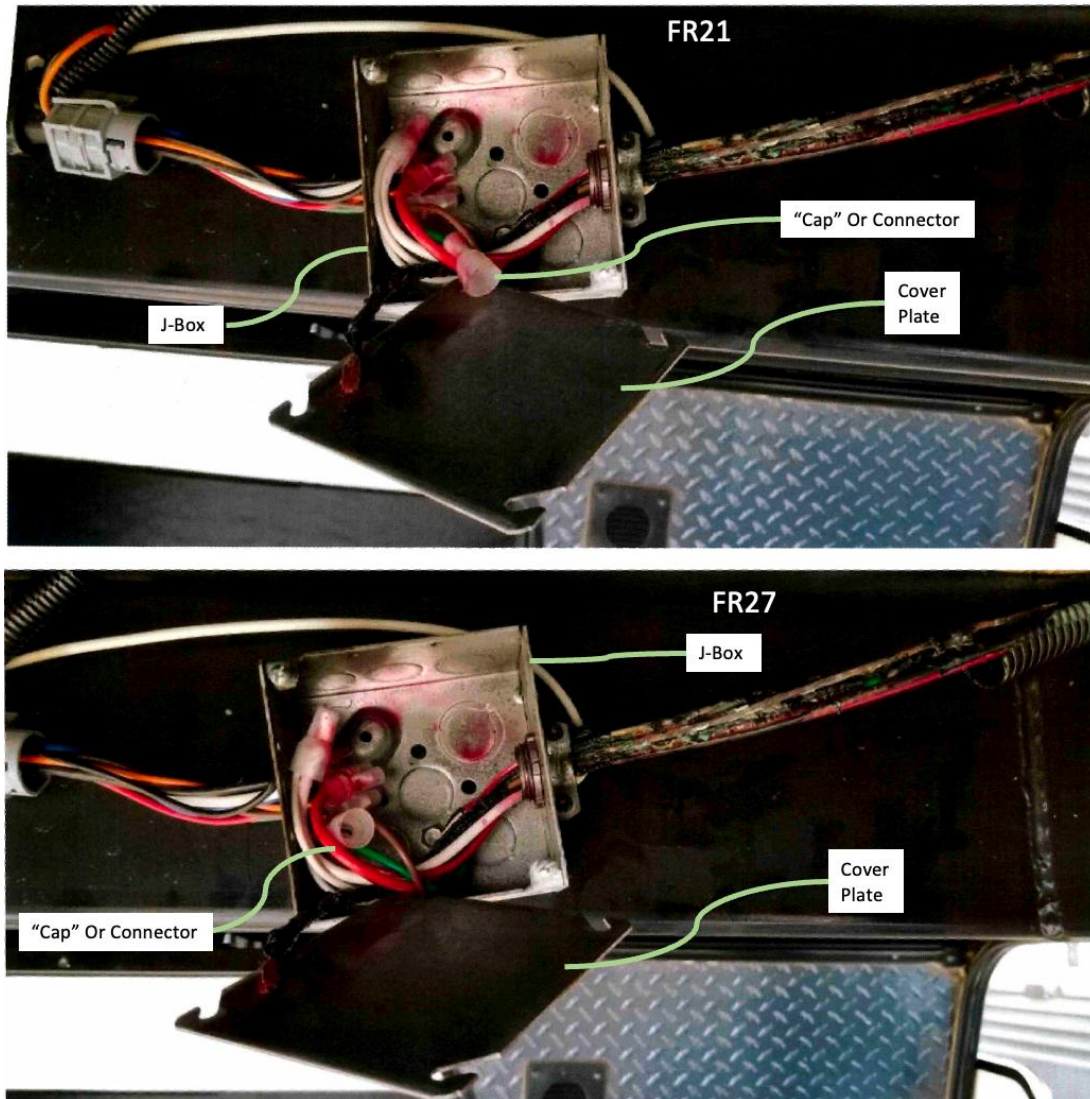


Figure 38. Nelson's 2019 Puma after fire incident due to seven-way wiring defects. The images are from ForestRiver0000021 and ForestRiver0000027.

175. Tracing the 7-way charge line of the 2019 Puma, confirms back to the battery compartment area shows that the 7-Way charge line was in direct communication with the battery of the trailer, with absolutely no overcurrent protection.

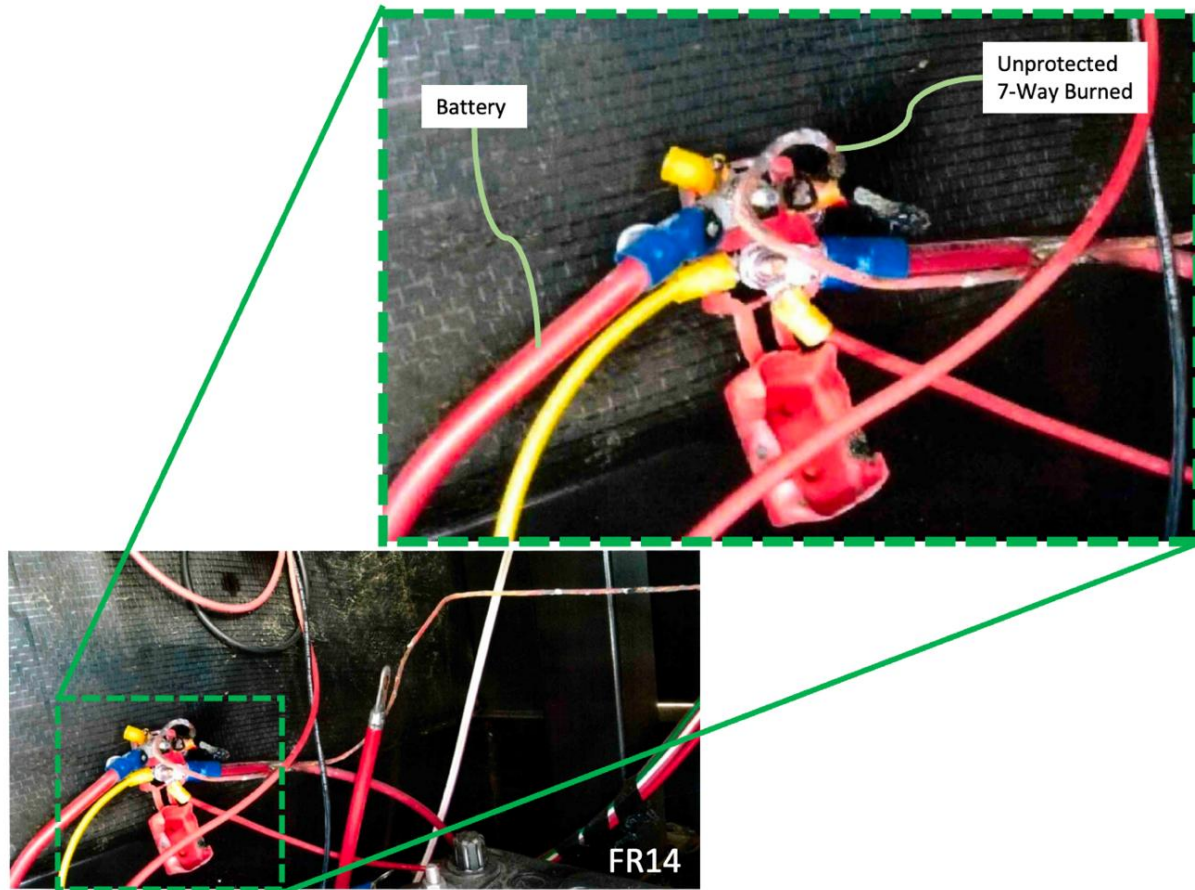


Figure 39. Nelson's 2019 Puma after fire incident showing the breaker region with a single Mini breaker and the 7-way charge line directly connected the unprotected side. Simply put the 7-way charge line is directly connected to the battery.

176. The conclusion of the incident reconstruction is that Forest River did not provide overcurrent protection on the seven-way wiring, and used components not designed or rated for the towable RV environment.

177. As discussed extensively in the next section, NONE of the defects of associated with Nelson's 2019 Puma fire incident reconstruction are unique. Forest River has had issues with "cap" coming of at the junction box at least since 2013.

D. Forest River Erroneous Assertions Regarding Nelson's Case

178. The unprotected wiring is present in about 60% of Forest River towable RV products according to both the 2022 Survey and the Field Investigation. In fact, the schematic diagram for the travel trailer's electrical system clearly shows no overcurrent protection on the charge line (ForestRiver0030521), and the deposition of the Director of Codes & Standards confirms this.

179. Forest River initially claimed that overcurrent protection was not required on the charge line. Forest River's partial Recall 24V-395 is inconsistent with this. It covers 20 years of Cedar Creek production and 18 years' worth of Puma product. In just these two models, close to fifty thousand individual units left the Forest River assembly plant with unprotected seven-way wiring. This is only a small portion of the affected units. Moreover, Forest River's claim is not correct.

180. Forest River alleges Jay Nelson damaged the seven-way wiring by driving off the tow vehicle without disconnecting the 7-way plug or by taking too tight of a turn. Conway based this theory on a crooked junction box. As far as the crooked junction box with only one screw — it does not comport with the physics of this incident. Moreover, he opined a screw had broken, which is not correct. The inspection of Nelson's 2019 Puma performed on November 13, 2024, shows conclusively that only one screw was used to secure the junction box to the frame.

181. Regardless of why or when the push-in connector came out of the junction box, the cause of this fire was a lack of overcurrent protection on the charge line and other seven-way wiring defects.

182. The injection molding marking on the plastic push-in connector indicates that it is made by Arlington Industries.

183. On January 3, 2025, I called Arlington Industries (570) 562-0270 and reached their engineering department to inquire about the NM842 connector. A summary of key lines of inquiry is provided in Table 19. When I described these NM842-type connectors being used on an external application underneath an RV chassis, the engineer stated: “I suspect they are not using it in a proper installation.”

184. A video of the 2019 Puma inspection on November 13, 2024 Arlington snap-fit connector shows that a simple moment will cause the connector to dislodge.

Table 11. Arlington Industries – Conversation with Engineer

Lines of Inquiry	Answers
Are the fittings designed for a wet location?	“It is not a fitting design for a wet location for sure, it is a dry location fitting.”
Are the connectors a strain relief?	“Calling it a strain relief, probably is not accurate either. It is tested and listed for UL514B.”
Can this take a moment/loading arm?	“No. It is a plastic snap fit that retains in the knockout it is not build for any additional load beyond the pull out of the cable.”

185. Thus, Conway does not appear to understand strain relief, and Forest River is using a connector that was not designed for the loading associated with strain relieving a cable. Since Forest River solely uses the Arlington Industry connector (or a similar connector) to provide strain relief, even though it wasn’t designed for that, the connector’s snap-fit will fail over the life of the RV unit.

186. The 2019 Puma inspection conducted on November 13, 2024, revealed that there was never a second screw. There was only one hole in the frame behind the region of the junction box, as shown in Figure 85 below.

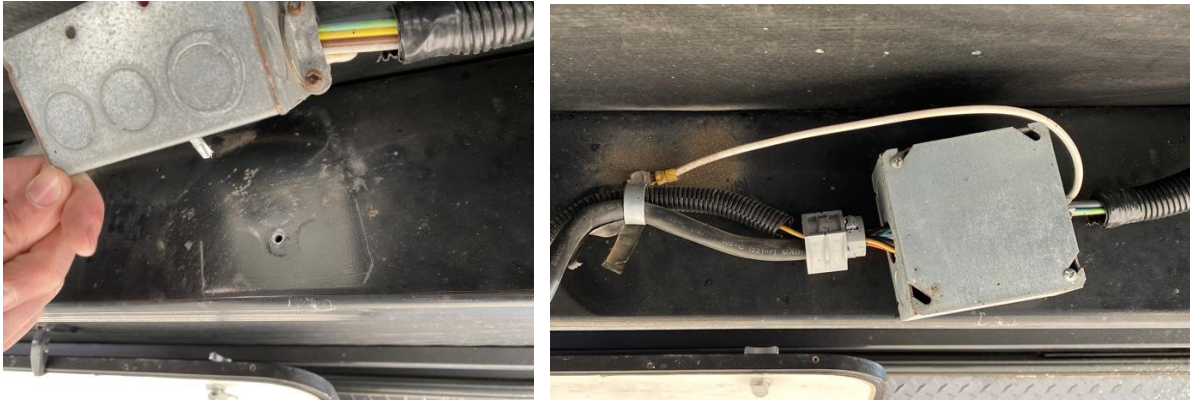


Figure 40. Forest River 2019 Puma junction box region on November 13, 2024

187. Rispen admits that if a self-tapping screw were to have broken off “you would see a hole in the frame where it was screwed to, then we would know something happened.” (Rispen 90:20-25). While Conway also claims that the angled metal junction box is an indication that the 7-way was pulled, Rispen, on the other hand, admits that sometimes Forest River screws it on at an angle (Rispen Dep. 90:3-5). In the words of Rispen: “It wouldn’t shock me to see one of these crooked at an angle, it wouldn’t shock me to see it straight.” (Rispen Dep. 91:1-4). Table 20 is a list of some of Conway’s mistake.

Table 12. Conway’s mistakes.

#	Conway		Corrections
1	Identified Connector as Strain Relief.	Misidentify Component	What Conway refers as the strain relief is a connector. Strain relief is a function.
2	The purpose of the strain relief is: “to keep the wire inside the box.”	Failure to Understand Function	The purpose of strain reliving a cable is to prevent any forces/loads from transferring to critical areas.

3	“The box is not fastened to the frame.”	Incorrect	The Junction box was fastened to the frame using one self-tapping metal screw. The box was installed crooked by Forest River.
4	“It was pulled hard enough to snap the screw off”	Wrong	The “junction box” has only been connected to the chasses via one screw.

188. With regard to Forest River counsel suggesting that a “sharp turn” in Black Sandy Campground could have caused damage to the seven-way wiring, it is amply debunked by the physical layout experiments done during the November 13, 2024 inspection of the 2019 Puma, Figure 86.





Figure 41. Photos of the 7-way cord in different geometric configurations with a vehicle

189. The 7-Way plug installed by Forest River at the time of manufacturing is a standard 8 ft line configured to connect either the bed of the truck or the connection next to the truck license plate.

190. As shown below, a non-metallic clamp connector was used in the 2019 Puma with no additional jacket protection. According to Conway, the loom just needs to abut the connector, which is wrong.



191. The chassis that Forest River uses may be purchased from Lippert; however, Forest River then makes modifications to the structure by making a hole on the fifth wheel chassis. Such holes are not finished cleanly but are left rough with burrs (sharp edges) capable of

cutting flesh many times. Once the wire enters the chassis structure, it is no longer protected with loom in the 2019 Puma inspected.



192. At the conclusion of the 2019 Puma inspection, Dr. Angle and I upgraded the seven-way wiring to a safer configuration using a plastic box, available commercially and designed specifically for the RV industry. We protected the bundle of wires going from the junction box to the battery compartment with loom, filed all of the sharp edges along the way. The total time to fix the 2019 Puma took 3 hours with two people.



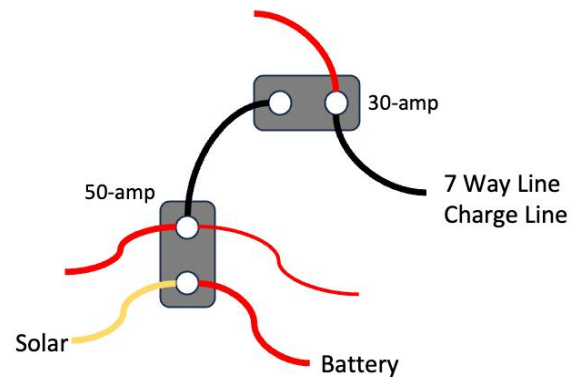
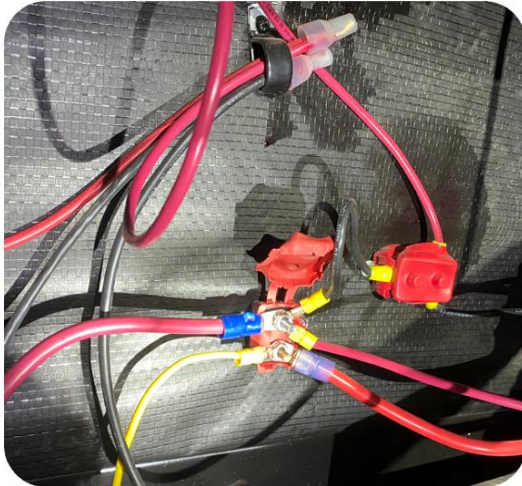
Figure 42. Upgrade to the 2019 Puma wiring with a plastic junction box

193. Inside the battery compartment region, a 30-amp breaker was added to protect the seven-way wiring going to the junction box.

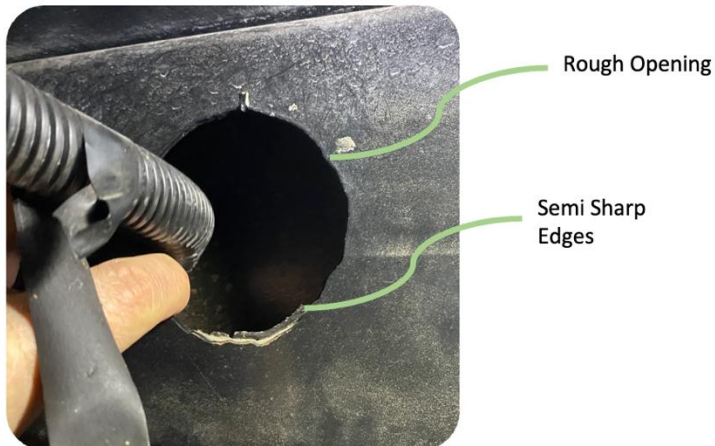


Figure 43. Additional breaker added 30-amp to protect the seven-way wiring

194. On November 13, 2024, we also inspected Nelson's 2020 Puma and the upgrades performed to comply with the Applicable Standards. The seven-way wiring was traced, and the charge line is now protected by a 30-amp breaker as shown below.



195. Nelson 2020 Puma Rough opening,



E. Discovery Documents showing similar defects

196. The push in connector used by Forest River routinely comes out. We observed this on new units that had never been used and on used units, and in warranty claims. The following photos show this issue.



ForestRiver0029845



ForestRiver0029849

XI. WIRING EXPERIMENTS

197. A series of experiments was performed to demonstrate the impact of Forest River failure to provide adequate overcurrent protection on the seven-way wiring. The experiment shows that a short can quickly generate damage to the towable RV and even catch fire. On November 14, 2024, as part of the Bozeman November 2024 inspections, I personally conducted the wiring experiments with Dr. Matthew Angle. Also present was Bob Wind.

198. The wiring experiment involved having a car battery connected to an 8-foot section of bundled (8 wires) within a loom, Figure 89. In Configuration A, the 30-amp breaker is bypassed, and in Configuration B, the 30-amp breaker is used. Two different runs were done using Configuration A to show the difference between having one wire shorted and two.

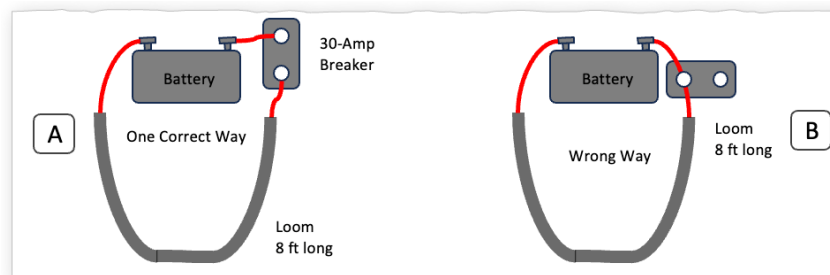


Figure 44. Experimental wiring configurations



Figure 45. Sample components used in experiments

199. As shown in the videos, protected electrical circuitry is safe and reliable, whereas unprotected circuits can cause smoke and even create a sustained flame.

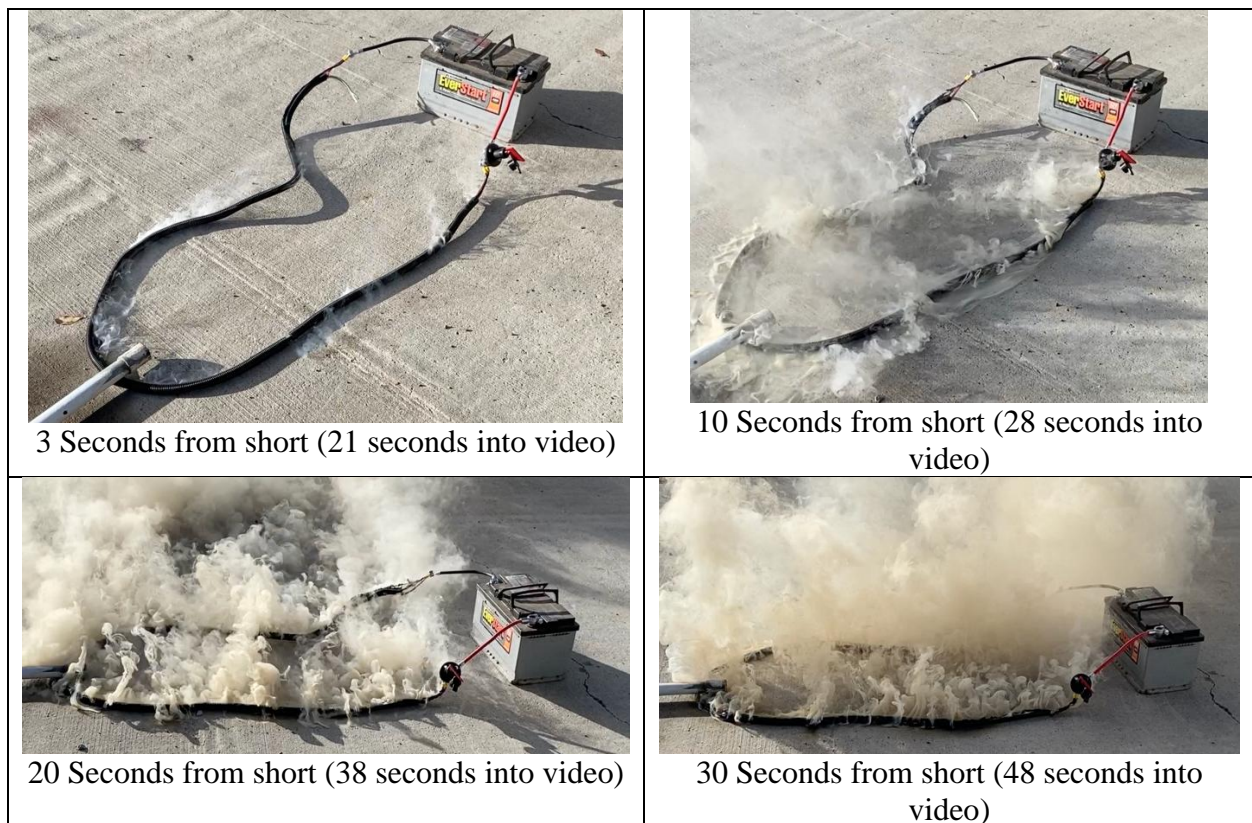
A. Video Two Lines

200. In the event that there are two lines energized by the short (charge line and the breakaway line), this experiment is conducted.

201. Once shorted the area can be engulfed in smoke in about 30 seconds, as shown in the double wire short experiment. For safety the experiment was done outside and on concrete. In a RV unit, as the insulation burns new regions of bare wire are exposed leading to new potential short locations along the route.

202. The videos show a two wires short time sequence. Table 14 shows a snapshot sequence at 3, 10, 20, and 30 seconds after the short is created.

Table 13. Wiring experiment with two lines shorted Short established 18 seconds into the video



203. Within 70 second of the short flames were established as shown below:



Figure 46. Dual wire experiment flames established and sustainable by the burning insulation Image was captured at time stamp 1:32 which is 74 seconds after the initiation of the short.

204. The wire reached the melting temperature of copper 1984° Fahrenheit confirmed by the little small spheroid like balls of metal left from the melting of the copper wire.

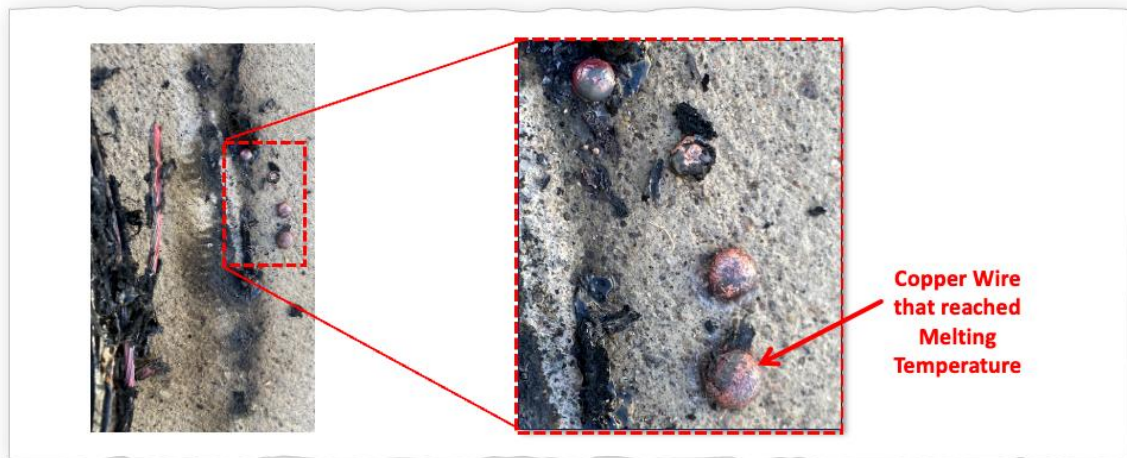






Figure 47. Evidence of temperature provided by the molten copper spheroids left

B. Video Single Line

205. A single wire short will also engulf the area in smoke in a period of 30 seconds, as shown in the single wire short experiment. The video shows a single wire short time sequence. Table 14 shows a snapshot sequence at 8, 14, 23, and 30 seconds after the short is created.

Table 14. Wiring experiment with single line shorted

	
8 Seconds from short (40 seconds into video)	14 Seconds from short (46 seconds into video)
	
23 Seconds from short (55 seconds into video)	30 Seconds from short (1:02 min into video)

C. Protected Circuit

206. For reference, the same wire components are used except the wire is protected by a 30-amp fuse called for in the Applicable Standards. The circuit breaker was removed from the housing to show how the bi-metallic breaker works. The result: a safe circuit.



Figure 48. Exposed bi-metallic strip of 30-amp breaker

XII. DAMAGE ESTIMATES

207. The detailed calculation of a highly conservative, minimum total damages associated with the Forest River seven-way wiring defects is ~\$2.25 billion using the 2022 Survey defective percentages and ~\$2.51 billion using the percentages from the Field Investigation.

208. The information provided ForestRiver0000151-153 for annual production between 2015 and 2023 confirms that our estimate of 100,000 units per year is conservative.

209. The following analysis is calculated with a yearly production volume of 100,000 RV units, even though 3rd party information suggests it is closer to 115,000 units per year.

210. The total damage estimates can be calculated with granularity, accounting for the wiring defect percentages based on the towable RV type (camping trailers, travel trailers, and 5th wheel).

211. To provide a comprehensive assessment of the total cost of damages, this section explores three different scenarios/variations to determine the number of units that need repair. The first scenario is to use the defect percentages from the Forest River 2022 Survey. The second scenario is to use the defect percentages from the Field Investigation of over 400 Forest River RV units.

212. The scope of the defect period is set to 20 years based on the release dates of the Forest River schematic drawings provided, sample Cedar Creek recall going back 20 years, Forest River limited warranty claim data going back to at least 2013, Field Investigation results that show units in the field going back to at least 2009, and Forest River wiring diagram going back to 2000.

213. As shown in Figure 49, the total cost of damages includes two components: inspection cost and repair cost. The following section describes the numbers, basis, and sources of information that go into this formula.

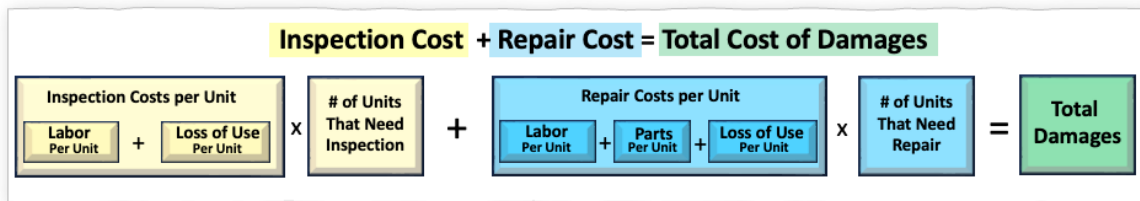
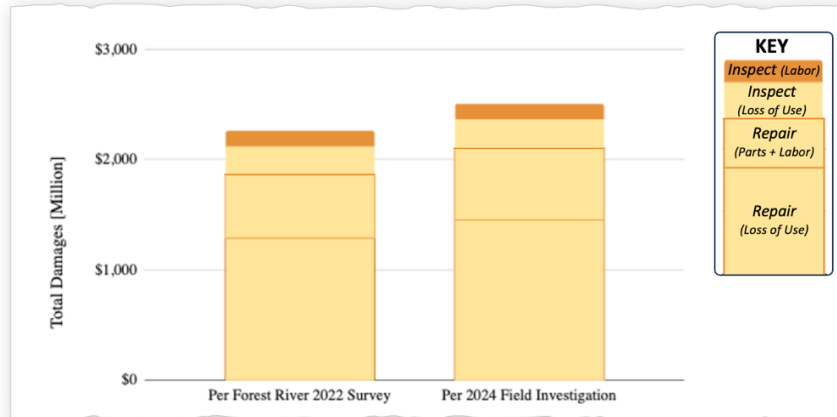


Figure 49. Total Cost of Damages Equation equals inspection costs plus repair costs.

214. The summary and break down of the detail analysis is shown in Table 15.

Table 15. Summary of total damages.

Details		Total 20 Years of Production at an estimated average of 100,000 per year. Values are in millions of dollars of total damage.	
		Per Forest River 2022 Survey	Per 2024 Field Investigation
INSPECTION	Labor	\$142.0	\$142.0
	Loss of Use	\$262.5	\$262.5
REPAIR	Parts & Labor	\$564.2	\$646.5
	Loss of Use	\$1,278.6	\$1,457.2
Total Damages Cost [Millions]		\$2,247.4	\$2,508.2



215. The Field Investigation has shown that some plants produce a mix of both good and bad units. We have documented the same model units fabricated less than a month apart with different over current protection

216. The analysis summarized above is worked out step by step in the following section.

A. Parts & Labor to Inspect and Repair

217. Table 16 shows the details of the parts and labor calculation with the full granularity of trailer type, estimated annual production volume, and percentage of impacted units for the two scenarios. The per unit cost is calculated using the equation below:

$$\text{Cost per RV} = \text{Shop Time Needed for Service} \times \text{Shop Hourly Rate} + \text{Parts for Service}$$

218. The total cost for parts and labor (calculated separately for inspection and repair) is determined by multiplying the Cost per RV by the total volume of units impacted, easily calculated using the equation below:

$$\text{Total Volume of Units Impacted} = \text{Annual Production} \times \text{Defect Time (yrs.)} \times \% \text{ of Units Impacted}$$

Table 16. Parts and Labor associated to inspect and repair.

Phase	Trailer Type	Shop Time Needed [Hour]	Shop Hourly Rate [\$ / Hour]	Fixed Cost for Parts [\$]	Annual Production [Units / Year]	Time [Year]	RV Units Impacted [%]	Total [Millions]
Inspection	Tent Trailers	0.50	\$142.00	-	3,200	20	100%	\$4.5
	Travel Trailer	0.50	\$142.00	-	78,600	20	100%	\$111.6
	5th Wheel	0.50	\$142.00	-	18,200	20	100%	\$25.8
	INSPECT: Labor							\$142.0
Repair per 2022 Survey	Tent Trailers	3.0	\$142.00	\$30.00	3,200	20	100.0%	\$29.2
	Travel Trailer	3.0	\$142.00	\$30.00	78,600	20	61.9%	\$443.7
	5th Wheel	3.0	\$142.00	\$30.00	18,200	20	55.0%	\$91.3
	REPAIR: Labor + Parts							\$564.2
Repair per Field Investigation	Tent Trailers	3.0	\$142.00	\$30.00	3,200	20	100%	\$29.2
	Travel Trailer	3.0	\$142.00	\$30.00	78,600	20	73.70%	\$528.3
	5th Wheel	3.0	\$142.00	\$30.00	18,200	20	53.60%	\$89.0
	REPAIR: Labor + Parts							\$646.5

B. Loss of Use to Inspect and Repair

219. The detailed calculation for the loss of use for inspection and repair by trailer type, estimated annual production volume, and percentage units impacted for the two scenarios is shown below. The days in the shop for inspection are set to the absolute minimum of 1 day. The following is for Loss of Use to Repair.

Phase	Trailer Type	Shop Time [Days]	Daily Rate [\$ / Day]	Annual Production [Units / Year]	Time [Year]	RV Units Impacted [%]	Total [Millions]
Inspection	Tent Trailers	1	\$65	3,200	20	100%	\$4.2
	Travel Trailer	1	\$125	78,600	20	100%	\$196.5
	5th Wheel	1	\$170	18,200	20	100%	\$61.9
	INSPECT: Loss of Use						\$262.5
Repair per 2022 Survey	Tent Trailers	8	\$65	3,200	20	100%	\$33.3
	Travel Trailer	8	\$125	78,600	20	61.9%	\$973.1
	5th Wheel	8	\$170	18,200	20	55%	\$272.3
	REPAIR: Loss of Use						\$1,278.6
Repair per Field Investigation	Tent Trailers	8	\$65	3,200	20	100%	\$33.3
	Travel Trailer	8	\$125	78,600	20	73.70%	\$1,158.6
	5th Wheel	8	\$170	18,200	20	53.60%	\$265.3
	REPAIR: Loss of Use						\$1,457.2

C. BASIS: Shop Time

220. **Inspection Time 0.5 hrs @ \$142/hr. OSI RATE.** To get an estimated cost of what it would take for Forest River towable RV owners to have their RV inspected, a number of RV dealers were contacted to get the shop hourly rates, minimum time charge, queue, and repair turnaround time. To simply check a towable RV unit's seven-way wiring, calls to dealers confirmed it would cost between \$100 and \$200 to diagnose/determine if the seven-way wiring on towable RVs was in compliance with applicable standards. Most dealers charged a minimum of one hour, and the remainder charged for at least 30 minutes.

221. The hourly rates range between 165.00/hr. and \$199.00/hr.

222. The diagnostics service is, for the most part, by appointment only, and the wait time for the next appointment can range anywhere between a week to two weeks all the way to 2 months, depending on the particular dealer. For the Loss of Use inspection analysis, the time period is limited to 1 day.

223. Additionally, if the customer is paying out of pocket, the waiting time is shorter. If the repair is done under warranty, the repair shops quote longer times.

224. **Repair Time 3.0 hrs. @ \$142/hr. OSI RATE** – The first order estimate for addressing the violations of the applicable standards in the seven-way wiring is on the order of 3 hours at the full shop rate. That does not include any additional findings during inspection like damaged wires or broken connectors. The time is also conservative because it does not include any additional time for trailers that have cover panels on the bottom of the chassis.

225. Three hours of time at the minimum hourly shop rate quoted (\$165/hr.) totals \$495, and at the mean shop rate (\$190/hr), it totals \$570. For all repair costs, we will use the conservative OSI rate of \$142/hr.

226. Three hours of work for addressing the applicable standards violations of the seven-way wiring is supported by the Forest River warranty claims data.

227. For reference, D&D RV Center, LLC provided an estimate to replace the wiring between the metal junction box and the battery compartment at 3.5 hours. (ForestRiver 117).

228. Although it may take approximately 3 hours to complete the repair, the turnaround time for the dealer to return the fixed unit is 8 days nominally (obtained from calling numerous dealers). Furthermore, there are at least 11 models that have a closed bottom that require additional work to even inspect. The 3 hours will include:

- Setup
- Check all Low voltage for defects for connectors, pinched wires, placement, etc.
- Remove sharp edges along route
- Loom up wires & route
- Strain Relief
- Replacing box
- Rewiring
- Fix the Connectors clamps
- Install 30 Amp breaker
- Testing the Unit
- Clean UP

D. BASIS: Rental Cost per Day

229. Aside from availability, the RV rental cost per day can vary with the following three factors: 1) type of RV (5th wheel, travel trailer, camper), 2) season (spring, summer, winter), and 3) geographical location.

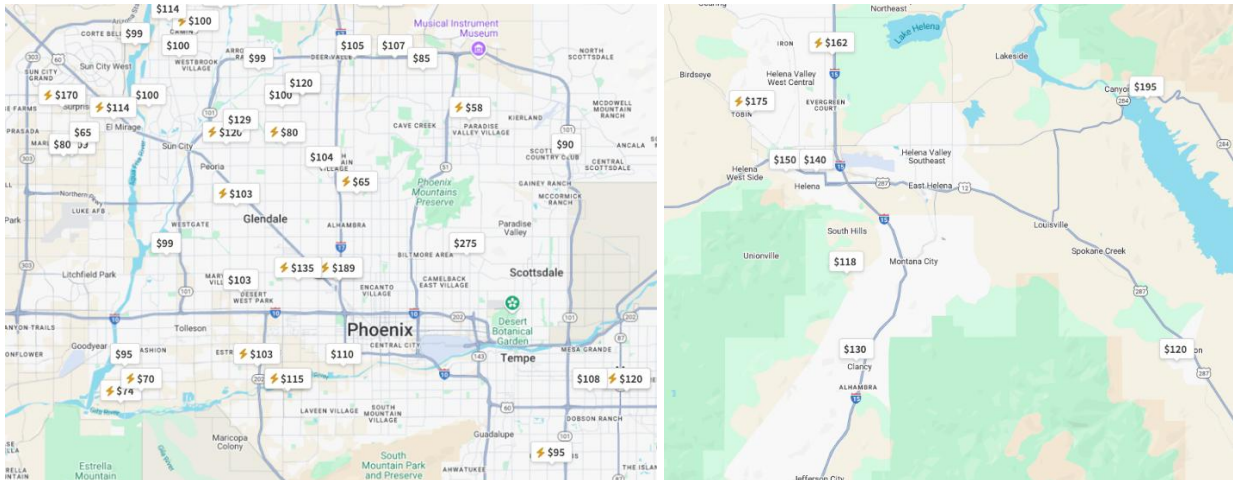


Figure 50. RVShare.com search for towable RVs in Phoenix, AZ and Helena MT area for February 2025

230. The RV rental cost per day for each type are as follows: tent trailers = \$65, travel trailers = \$125/day, and 5th Wheel = \$170/day. The daily rates for each RV are the most conservative values in the interest of Forest River.

231. As shown in Figure 51, a 2019 Forest River Alpha Wolf travel trailer can go as high as \$199/day and a 2020 Rockwood Mini Lite goes for \$125/day. Also shown is a 2021 Cedar Creek with a daily rate of \$199/day (this is normal). The daily rates were taken from a high-density rental location to minimize the effect of supply and demand. The daily rates were quoted low season (Feb 2025).

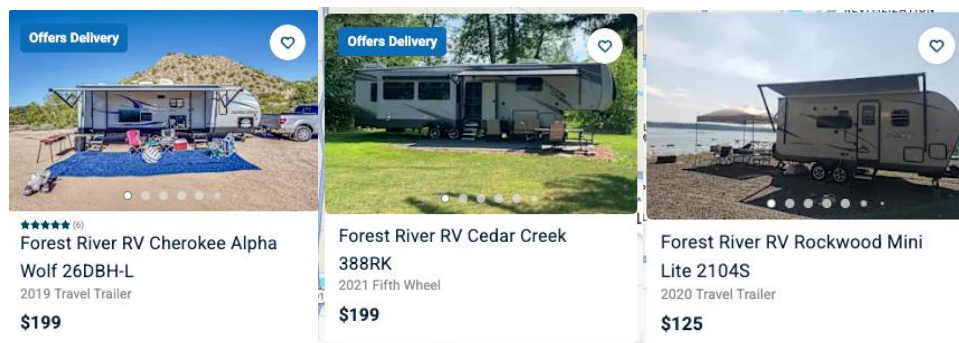


Figure 51. Example Rental costs of RV in Phoenix in Feb 2025

232. In the interest of calculating the most conservative estimate to benefit Forest River the following costs associated with an RV rental are not included: 1) Owner Fees, 2)

Insurance & Protection, 3) Service Fee, and 4) taxes as outlined in Figure 52. For the purpose of this analysis the minimum rental period of three days on most units will also be ignored.

The screenshot displays a rental breakdown for a Forest River Cedar Creek fifth wheel. The rental rate is \$199/night for the dates Feb 10-14. The pick-up location is Mesa, AZ, and the delivery is within a 0-mile radius. The optional upgrades section lists the following costs: \$199.00 x 4 Nights (\$796), Owner Fees (\$150), Insurance & Protection (\$223), Service Fee (\$122), and a Total of \$1,291 before tax. A 'Request to Book' button and a link to 'Ask owner a question' are also visible.

Optional Upgrades	
\$199.00 x 4 Nights	\$796
Owner Fees	\$150
Insurance & Protection	\$223
Service Fee	\$122
Total	\$1,291
Before tax	

Figure 52. Rental Breakdown of a Forest River Cedar Creek fifth wheel from 2021 in Phoenix Arizona in February 2025 (out of season). Source: www.rvshare.com

E. BASIS: Number of Units that Need Inspection & Time of Defects

233. Because of the lack of quality control, all towable RVs require inspection. Due to the lack of documentation and traceability in the assembly process, 100% of ALL of the Forest River towable RVs produced in the last 20 years needs to be inspected.

234. The engineering schematics drawing E-01-C is labeled to as released 9/8/2003. Therefore, the Time period should be at least going back to should be almost back to 2003. Conservatively the time span is 20 years, the same number of years that the Cedar Creek was recalled.

235. Forest River Warranty claims going back to at least 2013 have the documented problem with no overcurrent protection on the seven-way wiring.

236. The Field Investigation identified inspected a unit from 2009 that had the wiring defect. From 2012 to the present there are numerous examples with the wiring defect.

237. The schematic diagram for the travel trailers and tent campers has NO overcurrent protection on the seven-way wiring, according to the engineering schematic going back to the release date in June 2000.

F. BASIS: Annual Production

238. The following annual production estimate for Forest River is based on publicly available data from the RV Learning center website (www.rvda.org). While it is possible to make a first order estimate using just the Forest River bulk annual production, given the RV type granularity of the Forest River 2022 Surveys, Forest River wire schematics, and the 2024 Field Investigation the accuracy of the analysis can be more accurate by determining the annual production for the camping trailers, travel trailers, and fifth wheel individually.

239. The RVDA website has a page titled RV Manufacturer market share & retail/wholesale history where it lists the annual retail sales from 2007 to 2022, as shown in Figure in graphic form.

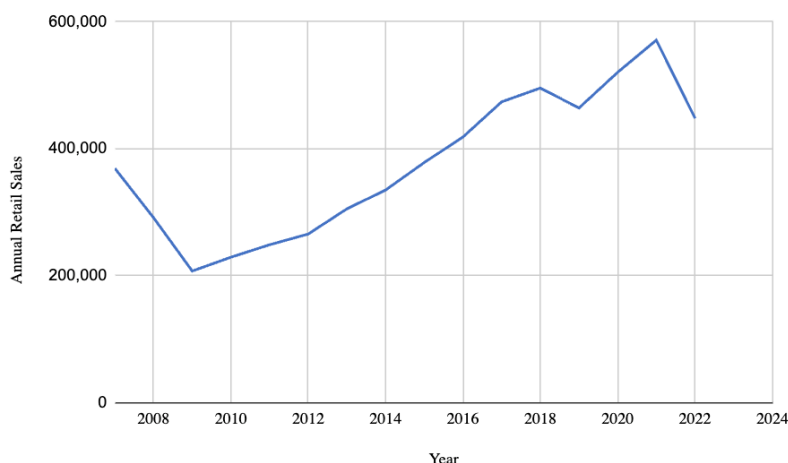


Figure 53. RVDA annual retail sales from 2007 to 2022. The average number of annual sales from 2007 to 2022 is 376,085.

240. The RVDA website also provides more detailed information of the retail registration from 2022 as shown in Figure 54, with the breakdown for type and Forest River market share percentage. The information can be used to provide an accurate estimate of the Forest River total annual production and annual production by type as shown in Figure 55.

RV Manufacturer Market Share and Retail/Wholesale History

Sources: RV retail and market share data compiled by RVDA endorsed provider [Statistical Surveys](#); wholesale data compiled by [RV Industry Association](#)

2022 Retail Registrations: United States

- Travel Trailers – 275,251 (vs. 350,527 in 2021; a 21.5% decrease). Market share leaders for the year were: THOR Industries Inc. (41%), Forest River Inc. (33.8%) and Grand Design RV Co. (7.6%).
- Fifth Wheels – 72,849 (103,300; -29.5%). Market share leaders: THOR (43%), Forest River (29.6%), Grand Design (18.5%).
- Camping Trailers – 6,875 (7,936; -13.4%). Market share leaders: Forest River (54.7%), Aliner (17%), SylvanSport LLC (6.9%).
- Park Models – 2,332 (2,708; -13.9%). Market share leaders: Skyline Champion (33.2%), Cavco Industries (20.2%), Kropf Mfg. Co. Inc. (11.9%).
- Class A Motorhomes – 11,031 (14,790; -25.4%). Market share leaders: THOR (53.4%), Forest River (16.5%), Newmar (13.1%).
- Class C Motorhomes – 20,028 (25,124; -20.3%). Market share leaders: THOR (52.4%), Forest River (24%), Winnebago Motorized (10.7%).
- Class B Motorhomes – 13,959 (12,180; +14.6%). Market share leaders: THOR (37.8%), Winnebago Motorized (37%), REV Recreation Group (6.3%).

Figure 54. RVDA.org website data ([source link](#))

Type	# Units	Forest River %	# of Forest River Units
Travel Trailers	275,251	33.8	93,034
Fifth Wheels	72,849	29.6	21,563
Camping Trailers	6,875	54.7	3,760
TOTAL Forest River Units in 2022			118,357

Figure 55. Total Forest River Units sold in 2022 to retail customers in the US

G. BASIS: Two Scenarios

241. **Number of RV's that need repair per the Forest River 2022 Survey** – In order to calculate the total number of towable RVs impacted by the wiring defect, we need breakdown the type of towable RV affected. The 2022 Survey conducted by Forest River as a direct response to the Nelson lawsuit has the following information about 64 plants. Per the Forest River 2022 Survey provided on February 4, 2025, the percentage of the units impacted by the type of trailer are as follows: tent trailers (100%), travel trailers (61.9%), and fifth wheels (55%).

242. The total number of units per type is calculated by multiplying the annual production by the percentage impacted.

243. **Number of RV's that need repair per the 2024 Field Investigation** - Using the Field Investigation we can determine the percentage of the units impacted by type of trailer are as follows: tent trailers (100%), travel trailers (73.7%), and fifth wheels (55.6%).

H. BASIS: Labor Rate for Repair & Inspection

244. The warranty claims hourly rates paid by Forest River in the past (per OSI warranty rates) range between \$85/hour (note that only 1 of the 56 rates is at this rate) and \$165/hour. Based on the OSI warranty rates paid by Forest River, the average rate for warranty work is \$141.78/hour. Therefore, the hourly rate associated with labor costs is set to \$142.00.

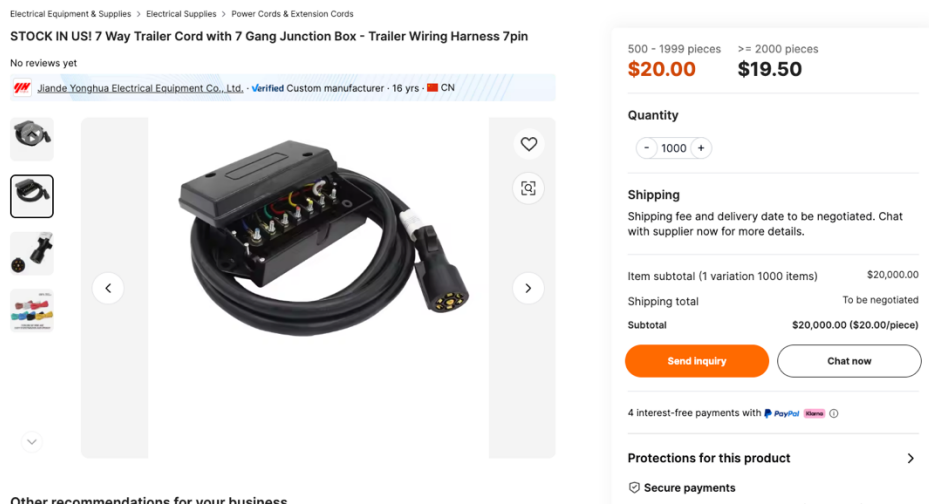
I. BASIS: Repair Parts

245. The raw material costs associated with the second breaker installation is on the order of \$1.01 USD. The material cost breakdown is listed below.

Table 17. Raw material cost to just add a 30-amp breaker and associated short link

#	Task	Qt	Bulk Price	Cost	Notes
1	Breaker	1	\$0.90/each	\$0.90	>= 2,000 pieces
2	# 12 Self tapping Metal Screw	2	\$0.02/each	\$0.04	>= 1,000 pieces
3	Short Link Line 3" Max 10 Ga	1	\$0.20/ft	\$0.05	>= 1,000 meters
4	End Connections for short link	2	\$0.01/each	\$0.02	>= 200,000 pieces
TOTAL				\$1.01	At OEM high Vol.

246. In the interest of time and safety, the fastest thing to do is to replace the 7 Way Trailer Cord with a 7 Gang Junction Box. At high volume, the price is \$19.50, but after tariffs, shipping, etc, the landed cost will be about \$26.

**Figure 56. 7-Way Cord**

247. The total cost for parts for a safer, faster assemble is \$30 per RV unit that needs to be fixed.

248. According to Forest River's motion to dismiss filed on 8-7-2024, it is clear that Forest River fails to understand the simplest reason for having an overcurrent protection device. According to Forest River: "The tow vehicle should provide overcurrent protection, and the overcurrent protection on the RV provides extra protection." (Doc 83 Defendants Motion to Dismiss 8/7/2024).

249. The most recent court transcript filed on 2-13-2025 shows that Forest River is now claiming that the 7-Way Cord and travel trailers are exempt from overcurrent protection, which is incorrect.

J. Hardware & Vendors

250. Forest River uses metal connector designed for home use (non – vibrating environment) to directly clamp on the insulated wires (No loom or any additional protection) Wenger (40:8-12)

251. Hardware components like the Arlington push in connector can be switched without approval by each plant.

252. “Installation instructions always took precedence over what the code said.” (Chapman 23:20-21).

K. External Reviews

253. The dealer relies on Forest River to implement the standards and to do it correctly. (Rispen Dep. 92:13-20). Rispen states that “At our [dealer level] we don’t even really know what those standards are, to be totally honest. I’m not sure anybody in our dealership could.” (Rispen Dep45:13-21)

254. When a unit is received the dealer will do normally perform an inspection; however, that inspection does not include code compliance. (Rispen 53:12-15)

255. The way units are fixed they “would replace it exactly like they saw the factory how they had done it.” (Rispen 86:14-18)

L. Plant Level Staff & People

256. There is a lack of communication between the different plants of Forest River. Each plant functions as its own entity.

257. In short Forest River does not have appropriate protocols and process controls in place as a company to protect the consumer safety when it comes down to the low voltage electrical wiring protection.

9 Q Mr. Smith, do you presently or have you ever had any
 10 responsibility for preparing or reviewing training
 11 materials for the plants to use in assembling or wiring
 12 or routing 12 volt electrical systems in RVs?
 13 MR. HAYDEN: Objection. Compound.
 14 Q (BY MR. TURNER) Go ahead.
 258. 15 A No. That's an engineering thing. I'm not an engineer.

Figure 57. R. Smith Dep. 43:9-15

259. As the wording describes “over-current protection” is to protect from excess current, not voltage. Something so simple is not understood by a Forest River inspector with almost 10 years of experience, due to the lack of training.

17 Q And why does that breaker provide over -- over-current
 18 protection, and how does it provide over-current
 19 protection?
 20 MR. HAYDEN: Objection. Form. Compound. It's
 21 two questions in one.
 22 Q (BY MR. TURNER) Go ahead.
 23 MR. HAYDEN: If you can.
 24 A No, I'm not an engineer. I, I don't know other than it's
 25 a voltage thing.

Figure 58. R. Smith Dep. 28:17-25

260. Electrical wiring employees learned on the job training. (Chapman 49:25-50:4).

XIII. FOREST RIVER TRIAGE & ROAD MAP

261. This is not a complicated issue. Forest River needs sufficient quality control and training of personnel who wire seven-way wiring in towable RVs. As of now, it does not have that. Plant managers can wire how they want, no uniform, compliant schematics exist. No

uniform training exists. These are easy things to remedy and could be done in a matter of days. No reason exists to ignore this ongoing, easy-to-address, serious problem.

XIV. CONCLUSIONS

262. Forest River had ample time in the ~20 years of producing Cedar Creek and ~18 years of producing the Puma model to catch the seven-way wiring defects. In short, the existing Forest River quality control and safety compliance infrastructure were ineffective in protecting the consumer and public from the seven-way wiring defects. There are also multiple warranty claims that put Forest River on notice of the seven-way wiring defects that violate applicable standards.

263. Forest River's placement of the RVIA Seal and the separate decal, both certifying compliance with applicable standards, is not correct. Forest River has produced towable RVs likely for 20 years that violate applicable standards regarding the seven-way wiring.

264. The 2022 Survey demonstrates that Forest River had a significant problem in their low voltage wiring widespread across 60% of their plants.

265. Our investigation is consistent with the 2022 Survey.

266. The 2024 partial recall does not address all the seven-way wiring defects, nor does it cover all affected models.

267. Forest River has manufactured about 60% of Forest River towable RVs with unsafe seven-way wiring. Because of a lack of sufficient quality control, inspection of all towable RVs needs to occur, and those with violations of the applicable standards need repair.

Dr. Folkers E. Rojas, PE

PhD. Mechanical Engineering, MIT
<http://www.MillieRojasEngineering.com>

EDUCATION

Massachusetts Institute of Technology

- PhD in Mechanical Engineering - June 2014
- Master's of Science in Mechanical Engineering – February 2011
- Bachelor of Science in Mechanical Engineering – June 2009
- Bachelor of Science in Nuclear Sciences and Engineering – June 2009
- Minor: Earth Atmosphere, & Planetary Science – June 2009

Expertise:

Expert in an array of Mechanical Engineering fields. Expertise includes: 1) Machine Elements, 2) Manufacturing 3) Measurement/Instrumentation (i.e. Sensors, Electronics, DAQ), 4) Structures, 5) Heat Transfer, 6) Fluid Analysis, 7) Finite Element Analysis, 8) Product Development Process, and 10) Medical Devices. Full product development cycle expertise from design, CAD, machining, and production

Along with the hardware development, my background also includes: product safety evaluation, assessing compliance with industry regulatory safety standards, establishing safety protocols in machine shops and product assembly lines, cost benefit analysis, root cause analysis (i.e. hardware failure, portable battery fires.)

Engineering LICENSES & Review Boards

- Texas Board of Professional Engineers – Since December 2017
- New Hampshire Board of Professional Engineers – Since February 2019
- Arizona Board of Professional Engineers – Since Oct 2024
- NSF Reviewer, 2023-2024

WORK EXPERIENCE

Millie Rojas Engineering Corporation

Jan. 2020 – Current

- Engineering Services: Engineering Solutions, Prototyping, Testing, and Analysis
- Legal: Patent Litigation, Civil Litigation, Forensic Engineering Services

Raptors Design, Inc.

June 2014 – Jan. 2024

- CEO & Co-founder
- Oil Field Safety Equipment: HAWK Tool
 - Secured Repsol Foundation Award and Department of Interior Contract
 - Secured Government Research Contract with Bureau Safety Environmental Enforcement (BSEE)

(Folkers.Rojas@gmail.com)
<http://www.MillieRojasEngineering.com>

- Complete product development of HAWK safety tool: design / manufacturing / analysis / testing
- Successful product testing of 10,000 psi test 11-inch wellbore tests that demonstrates technology at scale.
- Engage with oil industry stakeholders: NOV, Cameron, Schlumberger, Trendsetter, Transocean, FMC Technologies, Shell, and BP

Massachusetts Institute of Technology: Instructor

February 2019 – Current (Part Time as Requested)

- Instructor 2.70 Fundamentals of Precision Product design with Prof. Alexander Slocum
- Engage with students to design, analyze, and fabricate critical machine elements.
- Convert concepts into viable easily manufactured components and guide students through the use of an array of fabrication equipment including CNC mills, and CNC lathes.
- Spring 2020 – Taught 2.70 Fundamentals of Engineering (FE) course to guide students through the licensure process.

Massachusetts Institute of Technology

TA: 2.75 Precision Machines & Medical Devices

September 2011 – May 2013

- Teacher's assistant helping 2 or 3 teams (4 students per team) of students per term to converge on the design, development, and proof of concept prototype of several medical devices.
- Responsible for helping students through the fundamentals of machine design, product development, design for manufacturing, and product development.

Schlumberger Doll Research

Intern

March 2008 – August 2010

- Design and manufacturing of engineering proof of concept prototype for: 1) downhole well integrity and 2) sand control using expandable structures.
- Co-inventor on an issued patent for sand control, using shape memory alloys structures to reduce sand production.

Jet Propulsion Laboratory

Intern: SWOT Project

June 2009 – August 2009

- Increased efficiency by rapidly converging design concepts into manufacturing drawings for SWOT Dr. Richard Hodges.
- Facilitated the procurement of antenna components by serving as the technical point of contact.
- Responsible for designing and rapid manufacture of prototypes and testing materials for electronic antennas.

Jet Propulsion Laboratory

Intern: Grail Project

June 2008 – August 2008

- Design and fabrication of Kapton sheet retention disk for the GRAIL Ka-band antenna, where the prototype build was delivered 2 months ahead of schedule.
- Designed and fabricated control box housing for electronics boards for the antenna in a quarter of time from the expected delivery period.

Massachusetts Institute of Technology: Undergraduate Research

PERG Lab: CSPonD Project

August 2008 – June 2009

- Responsible for developing a green energy low entropy heat exchanger for large scale manufacturing. The work is part of Prof. Slocum's Laboratory working on a joint collaboration across four departments at MIT. The research requires MatLab models and to support a low entropy generation system that would allow for improvement in the efficiency of the system.

Planetary Astronomy Lab: POETS Project

January 2008 – May 2008

- In charge of designing and manufacturing a filter-wheel/optics enclosure for NASA's InfraRed Telescope Facility (IRTF) in Hawaii. The project is part of the Portable Occultation, Eclipse, Transit System (POETS) installation; this will be first fast transfer CCD camera on a large telescope.

Planetary Astronomy Lab: Wallace Camera Project

June 2006 – Jan 2008

- In charge of evaluating, designing, and manufacturing an optical astronomical camera for the George Wallace Jr., Astrophysical Observatory, under the supervision of Professor James L. Elliot.

Planetary Astronomy Lab: Magic Upgrade

January 2007 – September 2007

- Responsible for evaluation, design, and manufacture of all parts for the upgrade of the MagIC Camera in Chile. The engineering phase of the project was completed ahead of time. The installation of the instrument of the Baade 6-meter telescope when as planned. The instrument was handed to the science group.

Planetary Astronomy Lab: Wallace Camera Project

August 2005 – August 2006

- Designing a satellite orbiter that can use interplanetary radiation as an energy source and a shielding mechanism. Supervision was provided by Professor Maria Zuber, Head of the Earth, Atmosphere, and Planetary Sciences department and a leading scientist in Mars exploration.

ACCOMPLISHMENTS

BSEE Contract Award (March 2016)
Repsol Foundation Innovation Award Winner (July 2014)
EUSPEN Challenge 1st Place Winner (July 2013)
CSPonD Masters Thesis (Feb 2011)
WAOcam Bachelor's Thesis (Feb 2009)
MagIC II (Sept 2007)
POETS IRTF Case (May 2008)

SKILLS

- **Certifications:** USPTO registered filler
- **Holistic Skills:** Rapid prototyping, cost analysis, development plan generation, contract negotiation
- **Engineering Software:** ADINA Inc, SolidWorks, ANSYS (Fluid, 1&2 way FSI, temperature, etc.), Labview, Siemens NX, Inventor
- **Engineering Software:** Altium - Circuit Studio
- **Math Packages:** MathCAD, Mathematica, MATLAB, Maple, Python
- **Manufacturing Software:** Omax, MasterCam, GibbsCAM
- **Analysis:** Machine Design, Manufacturing, Structures, Thermal, Electrical, Hydraulic system, Fluidic
- **Languages:** Fluent in Spanish and English. Semi Fluent in Assembly Language.
- **Manufacturing Tools:** CNC Lathe, CNC Mill, CNC Router WaterJet, 3D printing, Drill Press, welding MIG and TIG, and assortment of shop tools. (Over 18 years of experience in machine shop)
- **Website Developer:** HTML, CSS, Javascript, and much more.
- **Other Software:** Wordperfect, MS Office (Word, Excel, Powerpoint), Outlook, FilePro 7, Quicken, Fastrack, and Quickbooks, Dreamweaver CS6, Adobe PhotoShop and Illustrator

AWARDS

- Repsol Foundation 3rd Convocation Winner with HAWK Project
- European Union Society of Precision Engineering and Nanotechnology Challenge Winner. First Place July 2013
- MIT Spectrum: Real World Learning. Summer 09.
- Gates Millennium Scholar

PUBLICATIONS

- Modular apparatus for testing microfluidic cartridge, useful for point-of-care medical diagnostics and other applications. Galit H. Frydman, Alexander H. Slocum, Folkers E. Rojas. W02024073059A2. Pub. Date Apr. 4, 2024
- Modular Multi-Layer Microfluidic Cartridges, Galit H. Frydman, Alexander H. Slocum, Folkers E. Rojas, W02023018723A1 Patent Pub. Date Feb. 16, 2023
- Gray, L.A., Bisono, A.G., Rojas, F.E., Veroneau, S.S., Slocum, A.H. Caribbean-Wide, Negative Emissions Solution to Sargassum spp. Low Cost Collection Device and Sustainable Disposal Method, Luke Gray, Andres Leon, Folkers Rojas, Samuel Veroneau, Alexander Slocum. Phycology 2021, 1 pg. 49-75.
- Massaging Device, Alexander H. Slocum, Folkers E. Rojas. US Patent 9,839,575 B2. Pub. Date Dec. 12, 2017.
- A Complementary Safety Tool for Blowout Preventers, Folkers E. Rojas, Alexander H. Slocum. Offshore Technology Conference. 2-5 May 2016.
- Entangled Structures as High Cycle Compression Springs, Folkers E. Rojas, Alexander H. Slocum. Precision Engineering Vol 42 (October 2015) 346-351
- Long Thin Structures for Generating an Entangled Flow Restricting Structure, Folkers E. Rojas, Alexander H. Slocum. US Patent 2013/0299191 A1. Pub. Date Nov. 14, 2013.
- Method and Apparatus for Bringing Under Control an Uncontrolled Flow Through a Flow Device, Alexander H. Slocum, Folkers E. Rojas. US Patent 2013/0299195 A1. Pub. Date Nov. 14, 2013.
- Apparatus and Method for Sand Consolidation, Julio C. Guerrero, Adam Paxson, and Folkers E. Rojas. US Patent 8,789,595 B2. Date of Patent: Jul. 29, 2014.
- Slocum, A.H., D.S. Codd, J. Buongiorno, C. Forsberg, T. McKrell, J.C. Nave, C.N. Papanicolas, A. Ghobeity, C.J. Noone, C. Passerini, F. Rojas, A. Mitsos, "Concentrated Solar Power on Demand", Solar Energy 85 (2011) 1519-1529
- Gulbis et al. First Results from the MIT Optical Rapid Imaging System on the IRTF: a stellar occultation by Pluto and a transit by exoplanet XO-2b. Feb 2011. <http://arxiv.org/abs/1102.5248>

(Folkers.Rojas@gmail.com)

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LEADERSHIP ROLES

- Started YouTube Channel Dare2Make: *Art of Machine Design*
- Machine Shop Part time instructor at Edgerton (3 yrs)
- Precision Engineering Research Group Lab Manager and EHS Representative
- TA Precision Machine Design (3yrs) related to Medical Devices & Energy Projects

COMMITTEE ROLES

- **American Society for Precision Engineering (Task Force: Precision Design TLC Member)**
2023 – Current
- **American Petroleum Institute (Task Force: 16K New Technologies)**
2023 – 2024

IP Litigation History

Year	Case	Details	Role	Deposed	Client
2023	Persawvere vs. Milwaukee	21-400-GBW	Expert Witness Measurements	Yes	Plaintiff
2024	Jay Nelson vs. Forest River Inc	Civil Case CV-22-49-GF-BMM	Measurements, Analysis	Ongoing	Plaintiff